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THE

SCIENCE AND ART

OF

OBSTETRICS.

BY

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PREFACE TO FIRST EDITION.

I have been prompted to prepare this work by a conviction of the existence of an urgent demand for a treatise on the Science and Art of Obstetrics, in our School of Medicine, which should embody the advances recently made, and set forth the distinctive characters of our therapeutics in a rational and practical manner.

Treatment in obstetrical practice in a great measure is mechanical, and does not involve an extensive application of therapeutical resources. It is true that by the judicious use of homeopathic remedies labor may often be divested of its pathological features; yet we must beware of expecting too much. We cannot reasonably hope to flex an extended fœtal head, to amplify pelvic diameters, to reduce intra-uterine hydrocephalus, to effect version, or to arrest unavoidable hemorrhage by the most carefully affiliated remedy; and the sooner the sphere of remedial action can be settled, the better for us and the principles which we represent. The vantage-ground which we hold consists in our ability to reduce the number of cases demanding interference to a minimum, and to remove from the pathway of the parturient and puerperal woman all unnecessary difficulty and danger.

In preparing a practical and reliable work of this kind, it is always found necessary to draw largely from the writing and experience of others. In doing so, I have endeavored to award due recognition, and have sought to appropriate only the most valuable and practical truths.

Though the matter has been prepared with the greatest care, important omissions and glaring errors will doubtless be discovered, on account of which, in advance, I implore the reader's most gracious forbearance.

To numerous friends I would return my hearty thanks for the many aids and encouragements afforded; and to my enterprising publishers, for their excellent and energetic performance of the mechanical part of the work.

SHELDON LEAVITT, M.D.

CHICAGO, October 20, 1882.

PREFACE TO SECOND EDITION.

The first edition of this work has been out of print for about three years, during which time I have economized the spare moments, gathered from busy days, in preparing for this edition. So difficult has it been for me to find the necessary time, that, had it not been for the clamor of students, and the encouragement given by brother practitioners of sincerity and judgment, I fear the task would never have been finished. Whether the work, as now presented, will meet the needs, and fulfill the expectations, of those for whom it is intended, or not, they may rest assured that it represents a great amount of labor and earnest effort.

When I came to review the first edition, more than three years ago, so many changes and additions were found needful that I at once resolved again to undertake the drudgery inseparable from a thorough revision of a work of this size. What is herein presented has been fully reduced to manuscript, and reset, hundreds of pages being displaced by entirely new matter, and not a single page being reproduced without change. The size of the work has been augmented by upwards of one hundred pages, the therapeutic hints have been increased in number and perspicuity, recent methods have been introduced, imperfect cuts have been improved and some excellent ones added, until we are able to send out an entirely remodeled and reconstructed book.

I have bestowed unusual pains on the index. Much medical lore lies hidden in text-books for want of suitable facilities for revealing it to the busy practitioner. It has been my aim to make every important subject readily accessible. Furthermore, the names of all authorities mentioned in the work have been indexed, together with the topic in connection with which they appear.

I gratefully acknowledge special help in important details. The appendix consists of an excellent article on Antiseptic Midwifery prepared for the work by Prof. L. L. Danforth, M.D., of New York. The chapter on Puerperal Fever was written by T. Griswold Comstock, M.D., of St. Louis, and the therapeutics

of Syphilis During Pregnancy by Prof. T. S. Hoyne, M.D., of Chicago. Some valuable statistics and wise suggestions were furnished by George B. Peck, M.D., of Providence, and in preparing the index I was aided by Prof. F. H. Honberger, M.D., of Chicago. In addition to help so direct, rendered by these well-known gentlemen, I am indebted to Profs. Phil. Porter and George R. Southwick, and others, for valuable suggestions.

Notwithstanding the great care taken in its preparation, I am painfully conscious of numerous defects which mar the book, some of them plainly traceable to my lack of proficiency in literary composition. There are doubtless many glaring omissions in the matter of therapeutics, while again some of my recommendations will not meet the approval of those who regard mere medication as abundantly adequate for all exigencies.

In conclusion I reaffirm my implicit confidence in the efficacy of the indicated remedy for the correction of abnormal conditions which may reasonably be expected to respond to mere medication.

SHELDON LEAVITT, M.D.

148 THIRTY-SEVENTH STREET, CHICAGO,
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THE

SCIENCE AND ART OF OBSTETRICS.

PART I.

ANATOMY AND PHYSIOLOGY OF THE FEMALE PELVIC ORGANS.

CHAPTER I.

ANATOMY OF THE PELVIS.

An acquaintance with the anatomy of the female pelvis is indispensable to an intelligent comprehension of the details of the Science and Art of Obstetrics, and ought to be insisted upon as a preliminary to the study of this branch of medicine. Anatomy is, in truth, the A B C of medicine and surgery, and our progress in the latter will largely depend on our knowledge of the former.

The pelvis constitutes a bony case, or basin, within and upon which are all the organs directly concerned in the process of reproduction. Not only this, but through the canal by it formed, the fœtus passes in the act of parturition.

Component Parts of the Pelvis.—In the adult, it is composed of four distinct bones, namely, the two *ossa innominata*, the *sacrum* and the *coccyx*. The ossa innominata are united anteriorly, and, from their peculiar form, constitute the anterior and lateral walls of the pelvis. Posteriorly these bones articulate with the sacrum, which is interposed between their extremities. The coccyx is joined to the sacrum inferiorly in such a manner as to continue and complete the latter's structure.

The Os Innominatum.—This bone is formed by the union of three parts, the *ilium*, *ischium* and *pubis*, the perfect fusion of which gives to the bone a form unlike that of any other in the human frame. Osseous union of the parts is completed about the twentieth year. The bone is so irregular in shape,

that a description of it, however carefully given, would utterly fail to create in the mind, without the aid of a specimen or drawing, a clear conception of its anatomical characters. It is truly the nameless bone. It is formed of three parts, distinct in the infant and young child, united at the acetabulum, at first by cartilaginous, but eventually by osseous, structures. The lines of junction form a figure resembling the letter Y, but, after complete ossification, the evidences of primary individuality become almost wholly obliterated.

These three portions of the os innominatum have been named: 1. The *os ilium* hip, or haunch bone; 2. The *os ischium*, or sitting bone; and 3. The *os pubis*, pecten or share bone.



FIG. 1.—The right Os Innominatum. (Outer surface.)

Outer Surface.—The chief obstetric interest in connection with the innominate bone is directed to its inner surface.

Upon its outer surface are attached certain muscles, some of which render indirect aid in parturition, but are not indispensable to its easy performance. Powerful abdominal muscles find attachment to the crest of the ilium, which, with those springing from the tuber ischii and contributing to the structures forming the pelvic floor, exercise considerable influence over the parturient act.

Looking at its outer superficies we observe the broad, flat ilium, the bent ischium, and the projecting pubis, while at the point where these several parts are united, is the smooth, round depression known as the *acetabulum*, or cotyloid cavity, into which is received the head of the femur. We also notice in the dried specimen an aperture situated between the pubis and ischium, which, in the recent subject, is filled, or covered, with a membrane or ligament, which gives to the opening its name, the *obturator foramen*.

A small aperture only is formed superiorly, which serves to transmit the obturator vessels and nerve.

Inner Surface.—Bringing under view the inner surface, we observe that the bone is divided into a superior and an inferior part, by a ridge which traverses it transversely. This is termed the ilio-pectineal line, taking its name from the iliac and pubic portions of the os innominatum. On the lower and posterior part of the ilium is a roughened, ear-shaped surface, being the portion of bone which articulates with the sacrum, known as the *auricular surface.* These features being given, no further study need now be made of the os innominatum as a whole. Its several parts, however, are worthy further attention.

THE OS ILIUM.—This is the largest of the three, triangular in shape, situated superiorly, and, with its fellow of the opposite side, forming what is called the *false pelvis.* It presents an irregular, convex, external surface, with elevations and depressions which afford attachments for the glutei muscles. Its opposite or internal surface is smooth and concave, forming a fossa for the broad, flat iliacus internus muscle. It is united to the other parts of the innominate bone at its lower anterior margin by what is termed the body or base, which is thicker than other parts. The ilium, being broad and flat, forms an ala, or wing. Its superior margin, thickened into a lip for the attachment of certain muscles, is termed the crest. Upon the prominent anterior margin there are two eminences—one above, and the other below—known as the anterior superior and anterior inferior spinous processes. The body of the bone is separated from the wing on the inner surface by a well-defined ridge, which forms part of the ilio-pectineal line, and marks the boundary of the true pelvis.

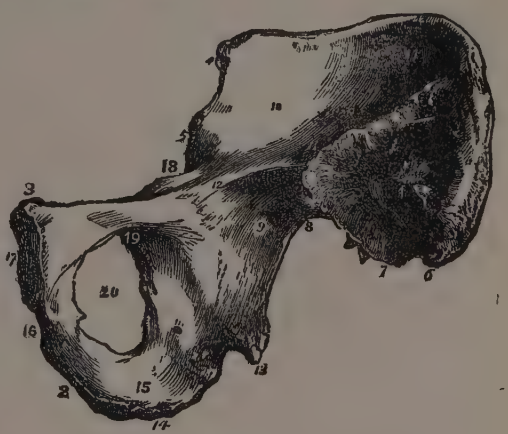


FIG. 2.—The right Os Innominatum. (Inner surface.)

THE OS ISCHIUM.—The bone is situated anteriorly and inferiorly to the ilium, and is joined to the latter at the acetabulum.

Projecting forwards and upwards from the base, which is the

thickest and strongest part of the structure, is a thinner portion, the ascending ramus, which is united to the descending ramus of the pubis, and aids in forming the obturator foramen and *pubic arch*. Between the two extremities of the ischium is a thick, strong portion, projecting downwards and constituting the most inferior part of the pelvis. This, from its form, is called the *tuberosity of the ischium*. Pointing downwards, backwards and inwards from the body of the bone, is a point of considerable obstetric importance, which has been termed "the key to the mechanism of labor," i. e., the *spine of the ischium*.

THE OS PUBIS.—This is a light v-shaped bone, situated most anteriorly, articulating with the ilium and ischium at the acetabulum, and with its fellow anteriorly. The body of the bone at its acetabular articulation is the thickest part, while from this there extends forwards and inwards a thinner part which is the horizontal ramus. The articulation of the pubis with its fellow of the opposite side is called the *symphysis pubis*, and from this part of the bone there stretches downwards, backwards and outwards a thin plate, the descending ramus, which joins the ascending ramus of the ischium. The superior margin of the pubis forms a continuation of the ilio-pectineal line. Near the symphysis pubis is an elevation, the spine of the pubis, to which is attached Poupart's ligament, and close to it the pectineus muscle. The pubis by its anterior articulation forms that important pelvic feature the *pubic arch*.

In figure 1 is shown the outer surface of the os innominatum. (1) is the ilium, (2) the acetabulum, (3) the crest of the ilium, (4) the anterior superior spine and (5) the anterior inferior spine of the ilium, (16) the horizontal ramus of the pubis, (19) the spine of the pubis, (20) the obturator foramen, (15) the ascending ramus of the ischium, (14) the tuberosity of the ischium.

Figure 2 shows the inner surface of the os innominatum. (1) is the articular surface of the ilium, (2) the ascending ramus of the ischium, (3) the spine of the pubis, (4) the anterior superior and (5) the anterior inferior spine of the ilium, (6) (7) the posterior, superior and inferior spines of the ilium, (8) the sciatic notch, (10) the iliac fossa, (12) the ilio-pectineal line, (13) the spine of the ischium and descending ramus of the pubis, (20) the obturator foramen.

THE SACRUM, or *Basilare*.—It is difficult to understand why this bone should have received a name indicating a quality

of holiness,—for sacrum means holy,—and that so general an idea of sanctity should have been connected with it in ancient times, by many different nations. It may be related in some way to the belief current among the Jews that "there is a small bone in the body which is indestructible, and which at the resurrection will gather about it, as to a center, all the other parts of the body and rise bodily into everlasting life."

The sacrum is a triangular bone, forming the base or lower termination of the spinal column, and binding together the ossa innominata. It is composed originally of five separate rudimentary vertebræ, of graduated sizes, which by their junction resemble a pyramid, with the apex downwards, its base forming a seat or plith, on which rests the last lumbar vertebra. The seams between the several vertebræ thus united, are distinct, and the edges of the bones form prominences easily felt on vaginal examination.



FIG. 3.—The anterior surface of the Sacrum.

The sacrum presents six surfaces for study, all of which are, in their main characters, of some interest to the obstetrician. The bone has a decided curve longitudinally, and a slight one from side to side, with the concavity looking inwards. Its superior, inferior and lateral surfaces are articular. The superior surface, or base, articulates with the last lumbar vertebra by means of an inter-articular disk of cartilage, and thus forms the *lumbo-sacral,* or *sacro-vertebral* joint. The intervening cartilaginous disk, from being thicker anteriorly than posteriorly, causes the base of the sacrum to project more than it otherwise would. This part of the bone, thus rendered prominent, is known as the *promontory of the sacrum.* The superior portion of either lateral surface articulates with the ilium to form the *ilio-sacral synchondrosis.* The small apex articulates with the coccyx below to form the *sacro-coccygeal joint.*

Looking at the inner surface of the bone, we discover on either side of the bodies of the fused vertebræ four openings, formed by the transverse processes. These are the sacral foramina, and transmit the anterior sacral nerves, which contribute to the formation of the great sciatic nerve that passes down

the outside of the thigh. The cavity formed by the sacral curves is known as the *hollow of the sacrum:* an important feature for the student to remember in connection with intra-pelvic anatomy. The surface of the bone is comparatively smooth, thereby favoring an easy passage of the fœtus through the pelvic canal.

The outer surface presents an entirely different aspect, being rough and tuberculous. In the median line are the spines of the vertebræ, while on either side are discovered openings which correspond to those on the inner surface, and which serve to transmit the posterior sacral nerves. The roughness of the posterior surface serves a wise purpose, since the tubercles give firm attachment to ligaments and muscles of much power and importance, especially those which serve to maintain the erect posture. The entire bone is penetrated longitudinally by the spinal canal, containing the terminal nerves of the spinal cord, which, from their bundle shape, are known as the *cauda equina*, or horse's tail.

THE COCCYX, or *huckle-bone,* is small and composed originally of four rudimentary vertebræ, which do not become ossified into one piece until middle life. In shape it somewhat resembles the sacrum, and is so articulated as seemingly to form a part of that bone. It may be regarded as the tail-bone of the species. Like the sacrum, it is turned base upwards, and apex downwards.

Two styloid processes project from the posterior lateral surfaces and rest upon the back part of the apex of the sacrum, thus preventing too great repression of the point of the bone during descent of the fœtus. There are corresponding cornua on the opposing part of the sacrum. The curve begun by the sacrum is so far extended by the coccyx that the latter bone is made to form part of the floor. Its apex represents the posterior pole of the conjugate diameter of the outlet, which diameter is considerably amplified during expulsion of the fœtus by a recession of the apex, through movement at the sacro-coccygeal joint.

CHAPTER II.

THE ARTICULATIONS AND GENERAL CHARACTERS OF THE PELVIS.

Having viewed the separate bones which make up the pelvis, we may now consider the articulations which result from their connection. We shall notice, (1) the symphysis pubis; (2) the ilio-sacral synchondroses, (3) the sacro-coccygeal articulation; in each of which the student of obstetrics will take interest.

THE SYMPHYSIS PUBIS is the articulation situated directly in front, resulting from the approximation of the two pubic bones. The articular surface of the bones is small, since the bone itself at this place is comparatively thin. The surface is

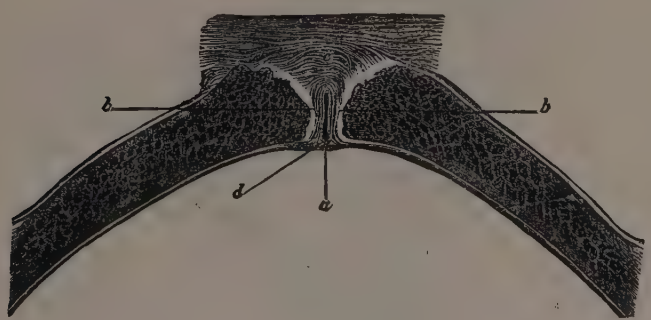


FIG. 4.—Section of the Symphysis Pubis.

invested with fibrocartilage, thickened anteriorly where the surface comes in contact with its fellow, and thinned posteriorly so as to leave a small space in which is a synovial sac.

The bones thus articulated form an arch, called the pubic arch, the crown of which is directly at the symphysis. It is highly important that the student bear in mind the existence, situation and form of this arch, inasmuch as under it the fœtus passes in parturition. A shortening of the span of the pubic arch operates to increase the pelvic depth anteriorly, and add greatly to the difficulties and dangers of parturition.

THE ILIO-SACRAL OR SACRO-ILIAC SYNCHONDROSES.—Attention has already been directed to the auricular surfaces of both the ilium and sacrum, the junction of which makes the joint under consideration. The bones once in position, we have, then, two synchondroses (so called), the right and left. The articular

surfaces are, in the recent subject, covered with fibrocartilages, and there is found between them, as in the other pelvic articulations, a synovial membrane, which becomes more distinct during the latter part of pregnancy.

MECHANICAL RELATIONS OF THE SACRUM.—If we regard the sacrum, as does Dr. Matthews Duncan, as a strong transverse beam, curved on its anterior surface, with its extremities in contact with the corresponding articular surfaces of the ossa innominata, the important medical relations sustained by the

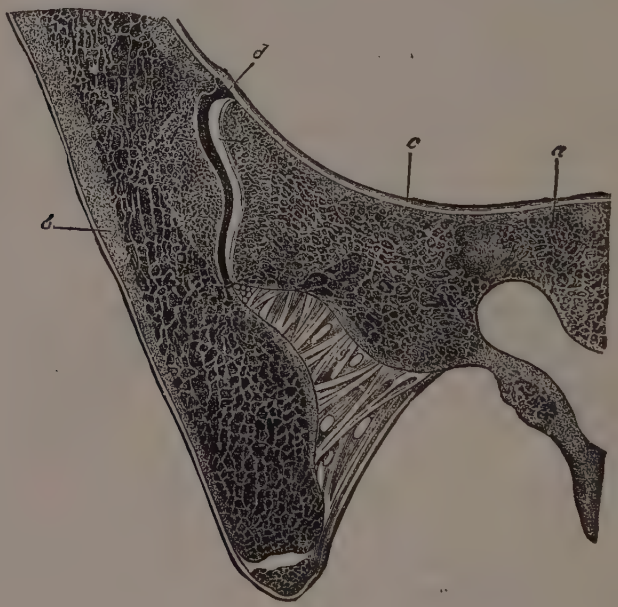


FIG. 5.—Section through the left Sacro-iliac Articulation. (Natural size.)

ilio-sacral synchondrosis at once becomes apparent. The weight of the body is transmitted to the innominate bones, and through them to the femurs. Counterpressure is applied, and there is thus exerted an important modifying influence on the development and shape of the pelvis.

THE SACRO-COCCYGEAL JOINT.—This is a ginglymoid joint, formed by the articulation of the bones from which its name is derived, and by means of it labor derives considerable mechanical advantage. When the long diameter of the head, in its progress through the pelvis, rotates into the conjugate of the

pelvic outlet, the latter diameter, by movement backwards of the coccyx under pressure, is so amplified as to afford greater facility for escape of the fœtus. This movement, however, is not confined to the joint itself, but is generally shared by the points of ossification of which the coccyx is made up. This is especially true of the second and third, and the first and second segments.

The proximal surfaces here, as at the other articulations, are covered with cartilage, and between them is found a serous membrane.

Anchylosis of the sacro-coccygeal joint, and premature ossification of the separate pieces of the coccyx, may take place, and give rise to much delay, difficulty and suffering during descent of the head. Such anchyloses have been known to snap under pressure, with an audible report. Anchylosis of this joint constitutes an impediment to labor, and may necessitate forcible rupture through instrumental delivery. In all such cases a certain amount of attention should be bestowed on the reparative process, to prevent reunion of the parts with the coccyx in an unnatural position.

THE LIGAMENTS OF THE PELVIS.—These are by no means few in number, when those which are in close relation to the articulations are included. The symphysis pubis receives strength from ligaments stretched from one bone to the other on every side of the joint. We therefore have superior and inferior, inner and outer, ligaments. Of these, the posterior is a layer of fibers of little strength; the superior is connected with a band of fibers which arises from the spine of the pubis, and conceals the irregularities of the crest of the bone. The anterior is a layer of irregular fibers passing from one side to the other, and crossing obliquely the corresponding fibers from the other side; and the inferior, triangular, or sub-pubic ligament is so thick, and so shaped by its attachments to the rami of the pubes, as to give smoothness and roundness to the sub-pubic angle, and thereby to facilitate passage of the fœtus through the pelvic canal.

The ligaments which stay the ilio-sacral synchondroses are so arranged as to give the articulations great strength. The posterior sacro-iliac ligament consists of strong irregular bands of fibers, which pass from the overhanging portion of the ilium to the contiguous rugged projections on the lateral surface of the sacrum. One of these bands, prolonged from the posterior

superior iliac spine to the third or fourth vertebra of the sacrum, in a direction different from the others, is known under the name of the inferior, or oblique, sacro-iliac ligament.

The anterior sacro-iliac ligament is a simple fibrous lamina, extended transversely from the sacrum to the os innominatum. It is rather an expansion of the periosteum than a true ligament. The superior sacro-iliac ligament is a very thick fasciculus, passing transversely from the base of the sacrum to the posterior part of the inner surface of the bone.

These synchondroses are strengthened also by the *sacro-sciatic ligaments,*—greater and lesser. The greater, or posterior, arises from the posterior margin of the ilium, including the posterior inferior spine and the lateral surfaces of the sacrum and coccyx. It is broad and flat, but its fibers converge as they pass downwards and forwards to be inserted into the inner surface of the ischial tuberosity. The anterior or small sacro-sciatic ligament is triangular in shape, but shorter and thinner than the other. The origin of its base is blended with that of the greater, but is less extensive, and its apex is attached to the spine of the ischium.

These ligaments transform the sciatic notch into two foramina, the greater and the lesser sacro-sciatic. Through the former of these pass the pyriformis muscles, the great sciatic nerves, and the ischiatic and pubic vessels and nerves. Through the latter pass the obturator internus muscles, and the internal pubic vessels and nerves.

The functions of these ligaments is tersely put by Leishman as follows: "They act, as has already been mentioned, by preventing the displacement of the apex of the sacrum upwards and backwards,—an accident which, without their aid, the very oblique position of that bone would, in the erect position, be likely to engender; and therefore, in this sense, they strengthen the sacro-iliac articulation. But in addition to this, they close in, in some measure, the large irregular opening which constitutes the outlet of the pelvis, forming at the same time the framework of those soft structures which constitute the floor of the pelvis. The floor thus constructed exercises a very important influence on the progress of labor, and at the same time affords an efficient and elastic support to organs which would otherwise be liable to frequent displacement downwards."

The ligaments which strengthen the lumbo-sacral joint are

similar to those which join one vertebra to another. The anterior common vertebral ligament passes over the surface of the joints; and we also find the ligamenta sub-flava and inter-spinosa, as in the other vertebræ. The articular processes are joined together by a fibrous capsule, and there is also a special support given by the lumbo-sacral ligament, which stretches from the last lumbar vertebra on each side, and is attached to the side of the sacrum and the sacro-iliac synchondrosis. Mention should also be made of the ilio-lumbar ligament, which passes from the apex of the last lumbar vertebra to the thickest portion of the iliac crest.

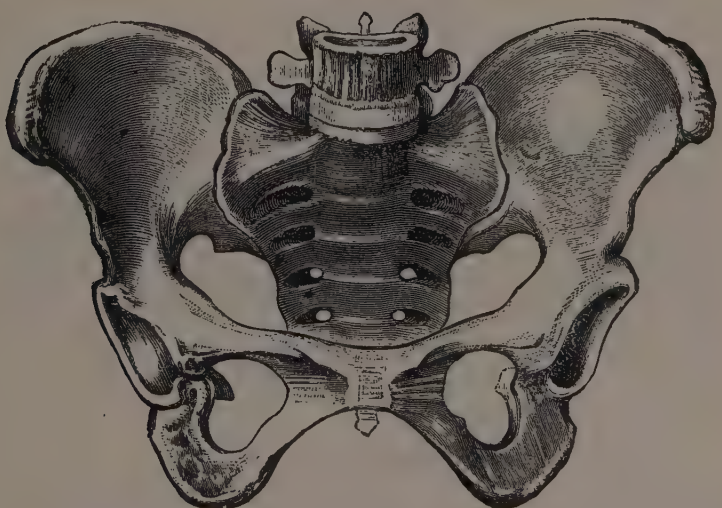


FIG. 6.—The articulated Pelvis.

The ligaments of the sacro-coccygeal articulation require but brief notice. The anterior consists of a few parallel fibers which descend from the anterior part of the sacrum to the corresponding face of the coccyx. The posterior sacro-coccygeal ligament is flat, triangular, broader above than below, and of a dark color. Arising from the margin of the inferior orifice of the sacral canal, it descends to, and is lost on, the whole posterior surface of the coccyx. It aids also in completing the canal behind. These ligaments seem to embrace the entire joint in a kind of capsule.

A few words remain to be said regarding the obturator ligament or membrane. As has been elsewhere stated, this struc-

ture is stretched over the obturator foramen, almost closing it, a small opening only being left for the passage of the obturator vessels and nerve. It is spoken of as a ligament, but it is thin, and in structure resembles an aponeurosis.

The Pelvis as a Whole.—Having made a somewhat detailed study of the several bones, joints and ligaments which contribute to form the pelvis, let us now view the structure as a whole, and note its remarkable characters. And as we do so, first of all we observe that by means of the peculiar form given it by the ilio-pectineal line and sacral promontory (which constitute the superior strait, or pelvic brim), the pelvis is natu-

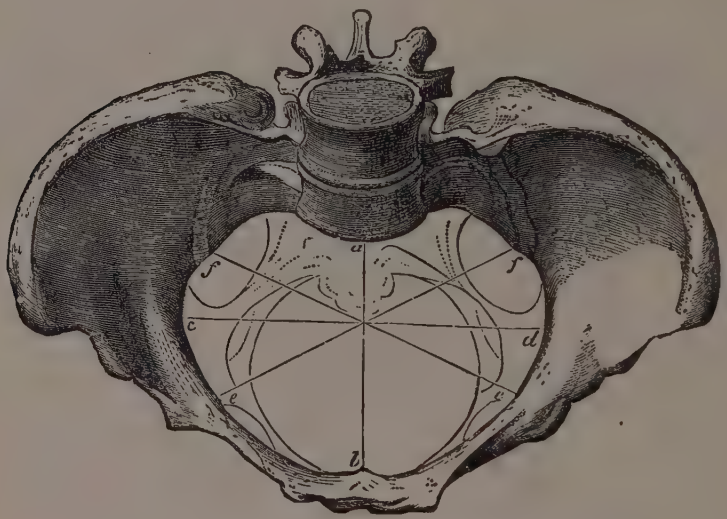


FIG. 7.—Showing the Diameters of the Superior Strait.

rally divided into superior and inferior parts, the former being termed the *false pelvis*, and the latter the *true pelvis*. In the living or recent subject, then, the false pelvis is bounded anteriorly by the abdominal walls, laterally by the broad flat wings of the ilia, posteriorly by the lumbar vertebræ and the posterior portions of the ilia, and inferiorly by the plane of the superior strait. The true pelvis is bounded posteriorly by the sacrum, laterally by the ischia and bodies of the ilia, anteriorly by the pubes, superiorly by the brim of the pelvis, or superior strait, and inferiorly by the outlet, or inferior strait. The broad expanded alæ of the ilia, the ischial tuberosities, the sacral promontory, and the pubic arch, are all peculiarities of

the structure that should be noticed. Within the true pelvic cavity, the hollow of the sacrum, formed by the curve of that bone, and the ischial spines, demand special attention.

We shall shortly enter upon a more minute study of the pelvic cavity, a part replete with interest, since it is the home of the unimpregnated uterus and appendages, and through it passes the fœtus on its way to light and liberty.

DIMENSIONS OF THE PELVIS.—Before proceeding further, the student will do well to familiarize himself with the dimensions of the pelvis. In giving these, certain terms will be used which require definition.

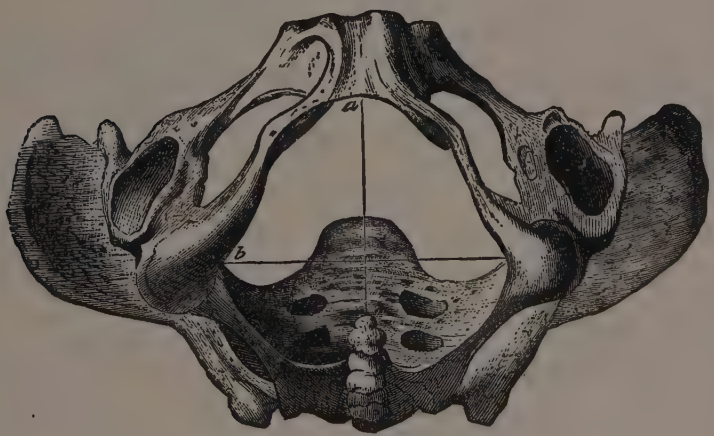


FIG. 8.—Showing the Diameters of the Outlet.

Referring now to figure 7, we have a diagram of the superior strait, or pelvic brim: *a-b* represents the antero-posterior, or conjugate diameter, the poles being at the symphysis pubis and sacral promontory; *c-d* designates the transverse diameter; *e-f* shows the left-oblique diameter, the poles resting at the right acetabulum or ilio-pectineal eminence and the left sacro-iliac synchondrosis; *f-e* marks the right-oblique diameter, the poles being found at the left ilio-pectineal eminence, or left acetabulum, and the right sacro-iliac synchondrosis.

With regard to exact dimensions, we should recollect that they can scarcely be given with any degree of assurance, inasmuch as actual measurements are found to be so various. It is only by taking the average diameters of a large number of pelves that we can acquire a clear idea of pelvic dimensions. But

what is of vastly greater importance than exact figures for the student of obstetrics to remember, are the relative measurements.

In the figures which follow, reference is had to the dried pelvis, divested of all soft parts save ligaments; but before submitting them a word is required with regard to the oblique and conjugate diameters of the pelvic cavity and outlet. In the instance of the former, one pole necessarily rests on the sacro-sciatic ligaments, and hence is not fixed. This is also true of the conjugate of the outlet, one pole of which diameter rests on the tip of the coccyx; and this bone, as has been explained, is pressed more or less backwards during descent of the fœtal head, thereby lengthening the diameter.

The following will then approximate the actual diameters of the true pelvic cavity, and of its superior and inferior straits:

	Conjugate.	Transverse.	Oblique.
Brim, or superior strait	4½	5¼	5
Cavity	5¼	5	(5¼)
Outlet	5 to 6	4¾	(4¾)

Other pelvic measurements are also submitted:—

Circumferential measurement of the brim	17
Measurement from the sacral promontory to the center of the acetabulum, or the ilio-pectineal eminence	3¼
Between the widest part of iliac crests	10¾
Between the anterior superior iliac spines	10¼
Between the front of symphysis and sacral spines	7

From the diameters of the true pelvis, as given, it will be observed that at the brim the conjugate is the shortest, and the transverse the longest. In the living subject, however, these relative dimensions are changed. The transverse diameter, from encroachment of the psoæ and iliac muscles, becomes shorter than the oblique. Then, on account of the presence of the rectum on the left side of the sacral promontory, the left oblique diameter is slightly diminished. The result of these changes is that the right oblique becomes the longest diameter, and hence the long diameter of the head is most frequently found in it.

INCLINATION OF THE PELVIS.—When the pelvis is placed upon a flat surface, so that the ischial tubers and coccygeal tip are brought upon the same plane, we do not get an accurate idea of the position which this part of the skeleton really occupies in the living, erect subject. Without entering into a narrative of

the different notions which have from time to time been held, it will answer practical purposes to say that the pelvis is so placed that, in the erect position, what are termed its horizontal planes sustain a marked inclination. This is an important fact, and should be clearly apprehended.

Now it has been found, that, while the inclination of the pelvis varies in different persons, and in the same person at different times, the general pitch of the plane of the superior strait is at an angle of say 60 degrees, and that of the inferior strait,

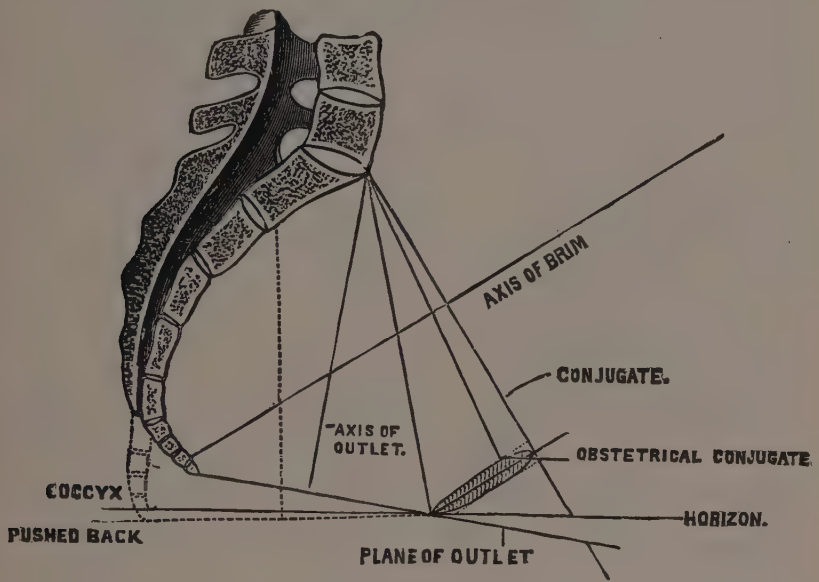


FIG. 9.

before recession of the coccyx, about 11 degrees with the horizon. The high practical value of these items of information will be clearly discerned as we proceed.

PLANES OF THE PELVIS.—It is not difficult to demonstrate what is meant by pelvic planes. That of the superior strait would be well represented by a piece of cardboard fitted into the irregular outline of this aperture. When viewed in conjugate section, the plane of the brim would be represented by a line drawn from the superior margin of the pubes to the promontory of the sacrum. A piece of cardboard fitted into the outlet, so that one side of it would rest on the point of the coccyx, the opposite side at the crown of the pubic arch, with its lateral borders extending between the ischial tubers, would represent

the plane of the outlet. This plane, in a section like that in figure 9, would be represented by a line drawn from the subpubic margin to the tip of the coccyx. The change produced by recession of the coccyx is also well shown in the same figure.

Planes without number may be created within the pelvic cavity by carrying forward the lines representing the planes of the superior and inferior straits to the point of intersection,

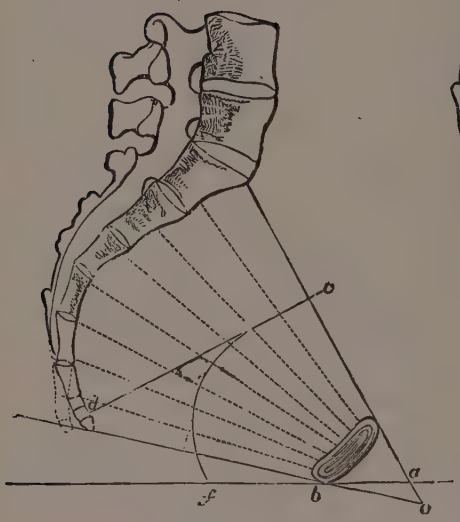


FIG. 10.

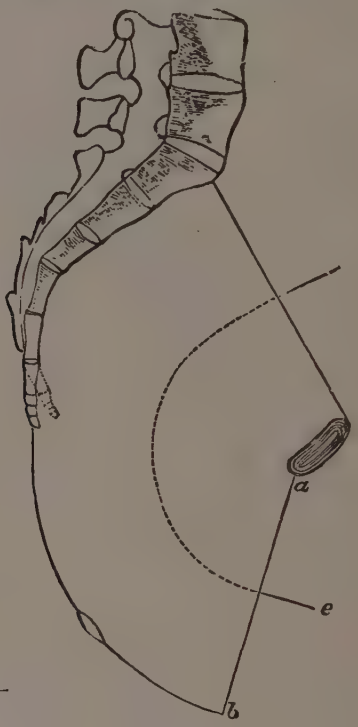


FIG. 11.

and from this, as a center, radiating other lines through the pelvis, as shown in figure 10.

AXIS OF THE PARTURIENT CANAL.—The axis of the parturient canal is its geometrical center. To demonstrate the axis of a perfect cylinder would not be difficult, but the parturient canal is a cavity of irregular dimensions, with diameters short in one part and long in another, and a depth much greater posteriorly than anteriorly. The axis of the pelvic brim is represented by a line drawn through its center perpendicularly to its plane, which, if extended, would touch at the umbilicus and

the coccyx. The axis of the outlet of the bony pelvis intersects this, and extends from the promontory of the sacrum through the geometrical center of the plane in question.

A good deal has been said by obstetrical writers about the "curve of Carus," and students should be made to understand its practical significance. It is formed in the following manner: The compasses are expanded so that when one point is placed at the middle of the posterior surface of the symphysis, the other will rest midway upon the conjugate diameter. The latter point is then made to describe a curve through the pelvic canal, and the line resulting is the curve sought. For practical purposes this will answer, yet it cannot be regarded as the real pelvic axis, since the posterior wall of the cavity has not a uniform curve. It is only by creating a large number of artificial planes like those represented in figure 10, and determining the geometrical center of each, that we approximate exactness. A line drawn through the center of such planes, from pelvic inlet to outlet, would be found to describe an irregular parabola, perfectly demonstrating the true axis of the pelvic canal.

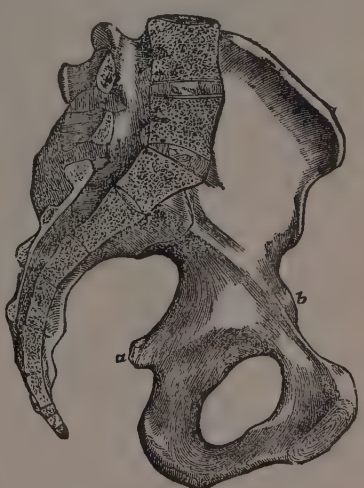


FIG. 12.

It must not be supposed that the plane of the bony outlet truthfully represents the plane upon which the fœtal head passes the vulva. The yielding pelvic floor is greatly stretched, and if the posterior boundary of the plane be established at the posterior vaginal commissure, we discover that the plane forms with the horizon an angle of 75 or 80 degrees. This is fully set forth in figure 11: *a-b* is the newly formed plane of the vulva, *r* is the anus, and *e* the line representing the axis of the parturient canal.

THE INCLINED PLANES.—When we look at a section of the pelvic canal, like that here shown, we observe that the lateral wall is easily divided into two parts, by a line extending from the ilio-pectineal eminence to the spine of the ischium *b-a*. That part of the bone in front of the line is inclined inwards, downwards and forwards, while that behind the line is inclined in-

wards, downwards and backwards. These are the anterior and posterior inclined planes of the ischium. They sustain very important relations to the mechanism of rotation of the fœtal head in the pelvic cavity, as will be shown in a subsequent chapter.

MALE AND FEMALE PELVES.—With dried specimens before us, it is apparent, even on cursory comparison, that there is a dif-

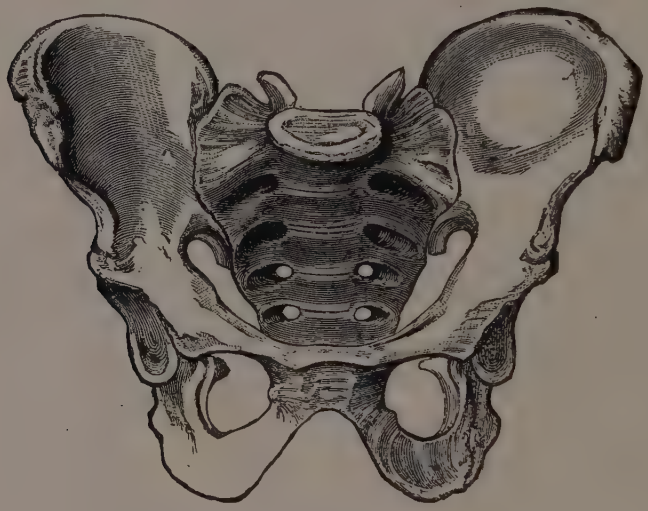


FIG. 13.—Male Pelvis.

ference between the male and the female pelvis. In order to render the variations explicit in detail, the following contrast has been drawn:

MALE AND FEMALE PELVES COMPARED.

FEMALE.	MALE.
1. All the bones are comparatively light in structure, and the points for muscular attachments are only moderately developed.	1. All the bones are comparatively heavy in structure, and the points for muscular attachments are well developed.
2. The iliac wings are widely spread, so that when seen from before the broad expanse of the iliac fossæ comes plainly into view.	2. The iliac wings are not widely spread.
3. The ischial tuberosities are widely separated, so as to give a transverse diameter at the outlet of 4¾ inches.	3. The ischial tuberosities are comparatively near, giving a transverse diameter at the outlet of say 3½ or 4 inches.

4. The sub-pubic angle is obtuse (90° to 100°), and span of the arch broad.

5. The pelvic cavity is wide and shallow, and the sectional area of the brim and outlet about equal.

6. The sacrum is broad, and its promontory moderately prominent.

4. The sub-pubic angle is acute (70° to 75°), and the span of the arch narrow.

5. The pelvic cavity is narrow and deep, and the sectional area of the outlet considerably below that of the brim, giving to the pelvis a funnel shape.

6. The sacrum is comparatively narrow, and the promontory very prominent.

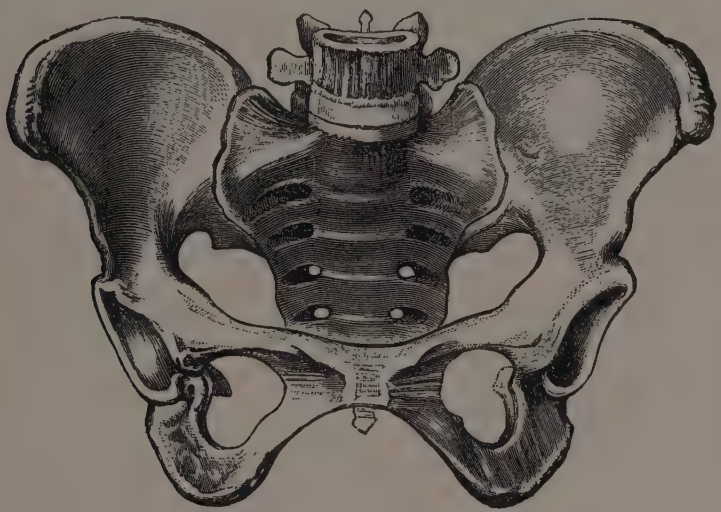


FIG. 14.—Female Pelvis.

7. The obturator foramina are triangular in form.

8. The spines of the ischia have a moderate projection into the pelvic cavity.

7. The obturator foramina are more oval in shape.

8. The ischial spines are remarkably prominent.

These differences between the male and the female pelvis are probably the result of the growth and development of the female internal generative organs, situated within the true pelvis. Schroeder, in proof of this, calls attention to the fact that in women with congenital defects of these organs, and in women who have had both ovaries removed in early life, the general form of the pelvis is masculine.

CHAPTER III.

THE FEMALE GENERATIVE ORGANS.

The female generative organs have been divided according to situation and function into external and internal organs. The external organs are those which are in view externally, and together constitute the *pudenda*. They are concerned mainly in the copulative act, but through them emerges the fœtus in parturition. They consist of the mons veneris, the vulva, the vagina and the perineum. The internal generative organs are concerned mainly in producing the ovum, developing and ultimately expelling it. They consist of the ovaries, the uterus, and the Fallopian tubes.

THE MONS VENERIS.—This is a cushion-like eminence situated directly upon the symphysis pubis and the horizontal pubic rami. It is composed mainly of adipose and fibrous tissue, and serves as a protection to the parts during sexual intercourse. At puberty it develops a growth of hair, the area thus covered forming a pyramid, the apex of which is at the vulva. Numerous sweat and sebaceous glands are found opening on its integumental covering.

The Vulva.—The vulva is made up of a variety of parts. The labia majora are two rounded folds of connective tissue containing a variable amount of fat, elastic tissue, and smooth muscular fibers. They originate anteriorly, at the posterior margin of the mons veneris, and, lying side to side, extend posteriorly, uniting at the anterior margin of the perineum to form the posterior commissure of the vulva. The margins which lie in contact, and the entire inner surfaces, are covered with mucous membrane, while the external surfaces are provided with ordinary integument. They are broad and flat in front, i. e., at the anterior commissure, but thin and narrow posteriorly. The integument for a certain distance from the mons veneris is thinly covered with hair, and is provided with a considerable number of sweat and sebaceous glands. In the mature virgin these external lips conceal the other vulvar structures, but in women who have borne children they are not so close, and from between them peer the labia minora. In young girls and old women the labia minora are also prominent.

THE CLITORIS.—Separating the labia majora, we find just

behind the anterior vulvar commissure, a small elongated body, called the clitoris. On careful examination, it is found to resemble the penis in form and structure, and, like the male organ, is the seat of the aphrodisiac sense. It differs from the penis in having neither corpus spongiosum nor urethra. It is divided into the crura, the corpus and the glans. The crura are long, spindle-shaped processes, attached to the borders of the ascending rami of the ischii and the descending rami of the pubes.

The corpus is formed by the junction of the crura in the median line, in front of the symphysis. The glans is the rounded, imperforate extremity. The mucous membrane covering the glans is of pale-red color, and contains numerous papillæ, part of which are provided with vessels, and part nerve endings, similar to those found in the nipple.

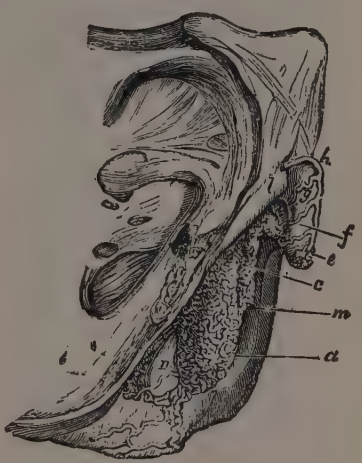


FIG. 15.—Lateral view of the Erectile Structures of the Female External Generative Organs. (The skin and mucous membrane have been removed, and the blood-vessels injected.) *a*, bulbus vestibuli. *v*, plexus of veins called the pars intermedia. *e*, glans clitoridis. *f*, corpus clitoridis. *h*, dorsal vein. *l*, right crus clitoridis. *m*, vestibulum. *n*, right gland of Bartholin or Duverney.

It is supported by a suspensory ligament which finds attachment to the anterior and inferior margin of the symphysis, while the nymphæ encircle it in such a manner as to provide a prepuce and render its likeness to the virile organ more exact. With such environment and anchorage, it cannot, when turgid and erect become very prominent, nor conspicuously display its true proportions. The entire organ measures about three-fourths of an inch in length. Its blood supply is received from the internal pudic artery through the dorsal and cavernous branches; its veins end in the vesico-urethral plexus; and it is provided with nerve communication through the internal pudic.

THE LABIA MINORA.—The labia minora, or nymphæ, are two folds of mucous membrane, which arise on either side from the center of the internal surface of the labia majora. They extend anteriorly, forming folds of considerable breadth, and finally

unite at the clitoris. As they approach this organ they bifurcate, the posterior branches being attached to the clitoris, and the anterior uniting to form a sort of prepuce for the organ. In some women, even in middle life, the labia minora become so elongated as to destroy the symmetry of the vulvar structures. This is especially true of certain negro races. As elsewhere stated, in adult virgins they are covered by the external labia, but in women who have borne children, in the aged and in young girls, they show themselves in the rima pudendorum. In young girls and virgins, the mucous membrane covering their surfaces is of a light pink shade, but in others it is brown, dry, and like skin in appearance. The mucous membrane is provided with tessellated epithelium, and a large number of vascular papillæ. On their inner surfaces are numerous sebaceous glands, secreting an odorous cheesy matter, which serves for lubrication and prevents adhesion of the folds.

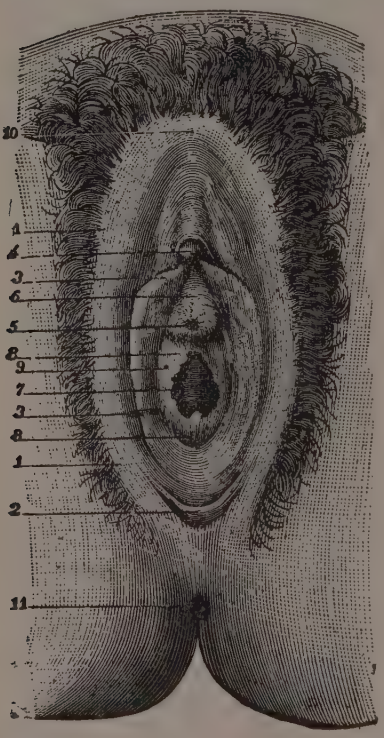


FIG. 16.—Vulva of the Virgin. 1, greater lip of right side. 2, fourchette. 3, small lip. 4, clitoris. 5, urethral orifice. 6, vestibule. 7, orifice of the vagina. 8, hymen. 9, orifice of the vulvo-vaginal gland. 10, anterior commissure of greater lips. 11, anal orifice.

"Among some of the Orientals," says Parvin, "the nymphæ are quite large, hindering the entrance of the penis, and their partial excision was the circumcision of females. Cuvier states that in the sixteenth century missionaries in Abyssinia persuaded their converts to abandon the custom, but as girls could no longer find husbands, the pope authorized a return to it."

THE VESTIBULE.—The vestibule is a smooth, mucous surface, triangular in form, with its apex to the clitoris, lying between that organ and the anterior margin of the vaginal orifice. It

is bounded on either side by the folds of the nymphæ, and posteriorly by the vaginal orifice. The mucous membrane of the vestibule is smooth, and, unlike the mucous membranes of other vulvar parts, is destitute of sebaceous glands. There are a few muciparous glands opening on its surface. At the center of the base of the triangle formed by the vestibule is situated an opening, the location of which should be familiar to the physician, namely, the *meatus urinarius*, or *meatus urethræ*. From this external opening the urethra passes upwards and backwards under the pubic arch, in the tissues which form the anterior vaginal wall, a distance of about one and one-half inches, to the bladder. It is composed of muscular and erectile tissue,

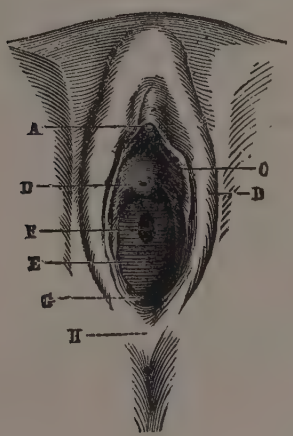


FIG. 17.

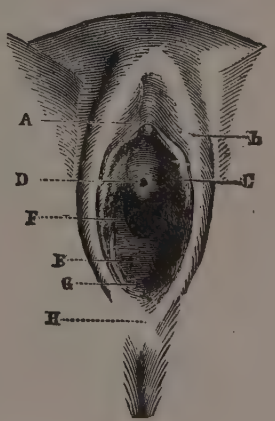


FIG. 18.

Figures showing different forms of Hymen.

and is remarkably dilatable. With the finger in the vagina, it can plainly be felt in the situation described.

VAGINAL ORIFICE.—The opening of the vagina is directly behind the vestibule. Its lateral boundaries are the labia minora for a short distance, and the labia majora in the main. Its posterior boundary is the fourchette, and its anterior the vestibule. In an undilated state it is a mere fissure, varying considerably in size.

THE HYMEN is a structure of variable thickness and strength, situated just within the vagina, and was formerly regarded as a seal of virginity. When intact, and of ordinary form, it serves as a complete bar to introception of the male organ, but it is frequently ruptured in infancy or childhood, through

accidental or other causes. When incomplete, or anomalous in structure, sexual congress may be held, and impregnation follow, without its destruction. There is a specimen of the female genitalia on exhibition in Meckle's museum, at Halle, from a woman who gave birth to a seven-months child, which shows a perfect hymen. There are also well authenticated cases on record of pregnancy existing in women with this part still not only of usual proportions, but with only small perforations.

It is generally crescentic in form, with the free border turned toward the anterior vaginal wall. In the main its structure is such (being chiefly a fold of mucous membrane with some cellular tissue and a few muscular fibers), that it tears easily under pressure. In other cases it is firm and unyielding, requiring incision to displace it.

Anomalies in form are not uncommon. Instead of presenting a free border anteriorly, it may be provided with a single central opening, or there may be a number of small openings. A fimbriated hymen is occasionally observed, which might easily be mistaken for one freshly ruptured. Instances of imperforate hymen are also met.

Carunculæ Myrtiformes.—These are small fleshy tubercles, from one to five in number, situated about the vaginal orifice, commonly regarded as remains of the ruptured hymen. Schroeder does not concur fully in this opinion. "In primaræ," he says, "portions of the torn hymen are suffused with blood (during labor), and destroyed by gangrene, so that in the vulva some warty, or tongue-like, projections remain."

THE FOSSA NAVICULARIS.—In women who have never borne a child there still remains a fold of mucous membrane at the posterior margin of the vaginal orifice, which has been termed the fourchette, or frænum. Situated between this and the posterior vulvar commissure is a little fossa called the fossa navicularis. In nearly all first labors the fourchette is torn.

THE SECRETORY APPARATUS.—Sebaceous glands are most abundant in the tissues of the nymphæ, where they furnish a fatty, yellowish-white material, possessing a peculiar odor. This, when allowed to accumulate beneath the prepuce of the clitoris, constitutes the smegma præputii, so common in women who neglect the niceties of the toilet. They are also present, as stated, though in fewer numbers, on the mons veneris, and labia majora. Mucous glands, five to seven in number, are found irregularly distributed about the meatus urinarius.

They are of the compound racemose variety, about the size of a poppy-seed, and possess short, wide ducts with large orifices. They are of aid to the beginner in locating the meatus urinarius for catheterism. These lacunæ may be sufficiently dilated to admit the point of a small-sized catheter, thus constituting a deception and snare.

The *Vulvo-Vaginal Glands* were first discovered by Bartholin, and have been called "the glands of Bartholin." The name of Duverney has also been attached to them. They are two in number, of the size of a small bean, and somewhat resembling it in shape, of a reddish-yellow color. They are situated near the pos-

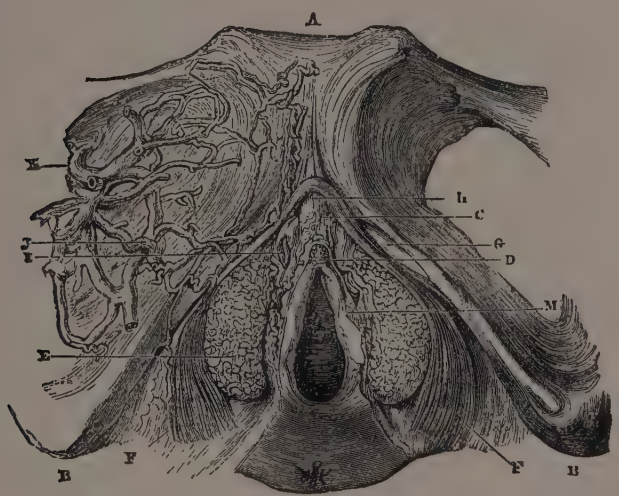


FIG. 19.—Vascular supply of Vulva. (After Kobelt.) A, pubis. B B, ischium. C, clitoris. D, gland of the clitoris. E, bulb. F, constrictor muscle of the vulva. G, left pillar of the clitoris. H, dorsal vein of the clitoris. M, labia minora.

terior part of the vaginal orifice, behind the posterior extremities of the bulbi vestibuli, which they partly overlap. These conglomerate glands are the analogues of Cowper's glands in the male. On section, they are found to be of a yellowish-white color, and made up of a number of lobules separated from each other by prolongations of the external envelope. The several ducts of the separate lobules unite in a common canal, about half an inch in length, which opens in front of the attached edge of the hymen in virgins, and at the base of one of the carunculæ myrtiformes in married women. They secrete a yel-

lowish viscid fluid, which is freely poured out during coitus and labor, the office of which is to prevent irritation by rendering the mucous surfaces moist and slippery. The glands are larger in young girls than in women of middle life, while in old age they in some cases altogether disappear.

THE BULBI VESTIBULI.—The bulbs of the vestibule are two curved masses of reticulated veins, somewhat resembling a filled leach, about an inch in length, situated between the vestibule and pubic arch on either side. They are covered internally by the mucous membrane, and embraced on the outside by the fibers of the constrictor vaginæ muscle. Kobelt claims that they correspond to the two separate halves of the male bulbus urethræ. The anterior ends, which are rather small, are connected by means of the pars intermedia with the glans clitoridis. The blood, during sexual excitement, is pressed through this communicating channel by reflex action of the musculus constrictor cunni, from the turgid bulbs, thereby flooding the erectile tissue and hardening the clitoris. These vessels are supplied with blood from the internal pubic arteries.

The Vagina.—This important part of the female generative apparatus is by some classed with the internal genitals, but it is here considered as an external organ. It is a cylindrical membranous tube, extending from the vulva to the uterus, and hence is sometimes called the vulvo-uterine canal. It is situated in the pelvic cavity, with the bladder anteriorly, and the rectum posteriorly, and, when put upon the stretch, extends nearly to the superior strait, following pretty closely the general curve of the pelvic axis. Its walls, while strong, are soft and yielding, and lie in contact, being flattened from before backwards. There has been considerable discussion over the length of this organ, and it is quite certain that the measurements given by some are excessive. When not drawn forcibly out to its greatest length, it can be fully explored with a finger measuring three or three and a half inches; but, when at its maximum, the length is probably four and a half inches —possibly five. Measurement varies greatly in different women. It is sometimes very short, the whole length being only one and a half or two inches. It is united to the bas-fond of the bladder by condensed areolar tissue, while the urethra is situated in its anterior walls. It is connected with the rectum in its superior part, by the double fold of peritoneum which forms Douglas's pouch, and in its inferior part by areolar tis-

sue. Its lateral borders are attached above to the broad ligaments, and below to the pelvic areolar tissue and some venous plexuses. The superior extremity, or fornix, encircles the cervix uteri below its junction with the corpus uteri, thus giving to the cervix a *supra-vaginal portion,* and an *intra-vaginal portion.* The superior boundaries of the vagina in thus folding upon themselves to embrace the neck, form a circular groove or *cul-de-sac*, described as the anterior and posterior vaginal *cul-de-sacs.* The posterior is deeper than the anterior.

Erroneous ideas are sometimes derived from the vagina being described as a tube with an external opening. It is a tube or canal, but one whose anterior and posterior walls are in contact. Its caliber varies in different parts, being least at the outlet.

The vagina is composed of an external, a middle and an inner coat. The external consists of cellulo-fibrous tissue, which connects it anteriorly with the bladder and urethra, laterally with the levator ani, and posteriorly with the rectum and peritoneum. The walls are of variable thickness. In the upper part of the canal the internal surface is smooth, and the thickness of the walls is only half a line to a line, while in the lower part it is much greater. The external cellulo-fibrous tissue coat is very elastic, and affords a fine bed for the vaginal blood-vessels. The middle coat is muscular, the fibers being of the involuntary variety. They run in both longitudinal and transverse directions, and are so interlaced that a dissection into separate layers is impossible. The connective tissue and muscular layers increase in thickness as they approach the vaginal orifice, the latter constituting two-thirds the thickness of the



FIG. 20.—The Vagina (after removal of posterior wall). *Ou*, meatus urinarius. *Oue*, external os uteri. B, section of wall at the fornix vaginæ. (Henle.)

vagina. Luschka has described a circular bundle of voluntary fibers, the *sphincter vaginæ* surrounding the lower extremity of the vagina and urethra. The action of this muscle not only narrows the vaginal orifice, but likewise serves to close the urethra by compressing it against the urethro-vaginal septum. The sphincter vaginæ and the sphincter ani form a



FIG. 21.—Section of Female Pelvis. 1, rectum. 2, uterus. 3, cul-de-sac of Douglas. 4, vesico-uterine space. 5, bladder. 6, clitoris. 7, urethra. 8, symphysis. 9, sphincter ani. 10, vagina. (Kohlrausch modified by Spiegelberg.)

figure of eight. The middle coat of the vagina is dense and fibrous, like the proper tissue of the uterus, and is continuous with it at the os and cervix uteri. Cruveilhier and other anatomists, have compared it to the dartos. The mucous lining of

the vagina, upon the lower portion of the anterior and posterior walls, in the median line, has two thickened ridges, termed the *columnæ rugarum*, or *vaginal columns*. The anterior is more prominent than the posterior, and is sometimes divided into two portions by a longitudinal furrow. From these two columns project folds of mucous membrane at nearly right angles, which are heavier and more numerous in the lowermost part of the vaginal canal. The rugæ, or cristæ, as some prefer to call them, are most distinct in virgins, less so in women who are accustomed to sexual intercourse, and are nearly absent in women who have borne children, and in those who have passed the child-bearing period. The purpose of these mucous folds is double—(1) to afford increased sensational area, and (2) more particularly to provide against rupture of the vaginal mucous membrane during the immoderate distension which takes place in labor. According to Henle, the muscular fibers of the vaginal columns possess trabecular arrangement and inclose offshoots from the vaginal plexus. Though thus constructed, the columns are not properly erectile. When turgid with blood, they close the vagina, but the resistance they offer is not formidable, since, like a sponge, they are easily compressed.

Microscopical examination discloses a large number of vascular papillæ studding the mucous membrane of the vagina, which under certain conditions, as those of pregnancy, become greatly enlarged, so that to the examining finger they seem hard and rough. Writers have frequently described the vagina as containing a great number of muciparous glands to which is attributed the secretion of the mucus which lubricates this tube. It has now become a conviction (unsettled, however, by some doubt) that there are no secreting glands. Dr. Tyler Smith, who was one of the first to deny their existence, says: "The mucus of the vagina is, I believe, produced by the epithelium, and consists of plasma and epithelial particles." This thin layer of mucus which covers the vagina even in periods of repose, is, as was pointed out by M. Donne and Dr. Whitehead, distinctly acid. Under sexual excitement, menstruation, and during parturition, the amount of secretion is greatly increased.

The lining coat of the vagina resembles ordinary skin almost as much as mucous membrane, and in cases of procidentia, under external exposure, it becomes converted into dermoid tissue. The mucous membrane is reflected over the vaginal

portion of the cervix and os uteri, whereon is everywhere found squamous epithelium.

The vagina is abundantly supplied with vessels and nerves. The blood is derived chiefly from the anterior branches of the internal iliac through the vaginal arteries, but in part from the inferior vesical and internal pudic arteries.

The arteries form an intricate network around the tube, and eventually end in a sub-mucous capillary plexus, from which twigs pass to supply the papillæ. These in turn again give origin to the venous radicals, which, uniting into meshes, freely communicate with each other and form a well marked venous plexus. The lymphatics conduct to the lateral glands within, and the inguinal glands without.

The nerves are derived from the hypogastric plexus.

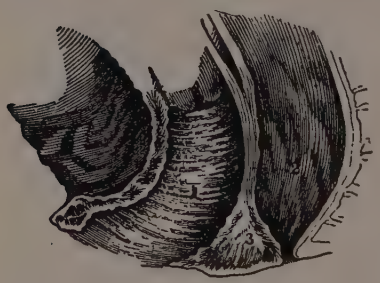


FIG. 22.—1, vagina. 2, rectum. 3, triangular notch or space into which penetrates the perineum.

THE PERINEUM.—The perineum is one of the most important structures in connection with the female generative apparatus, and hence merits most careful study. It is situated between the posterior vaginal commissure and the anus below, and the vagina and rectum above. It presents three surfaces for study, namely, the vaginal, extending upwards from the posterior vulvar commissure for a distance upon the recto-vaginal septum, the rectal surfaces extending from the margin of the anus upwards upon the recto-vaginal septum, while the third is that which stretches externally between the posterior vaginal commissure and the anus. The last constitutes its base, and measures from an inch to an inch and a half in length. The perineum is a body of considerable thickness, but during expulsion of the fœtal head it becomes greatly thinned and elongated, so that the dimensions of its base, as above described, are greatly increased.

The structure of this body is chiefly skin, cellular tissue, muscular fibers, and mucous membranes. The peculiar arrangement of the perineal muscles deserves notice, they being inserted by at least one extremity into tendinous structures and fasciæ. This is true of the sphincter ani, levator ani,

coccygei, transversi perinæi, erectores clitoridis, and sphincter vaginæ.

The fibers which are associated to form these several muscles are comparatively indistinct and are mixed up with a good deal of elastic dartoid tissue. Such peculiar construction of the perineum is what gives to it the quality of contractility and distensibility, so notably manifested during parturition.

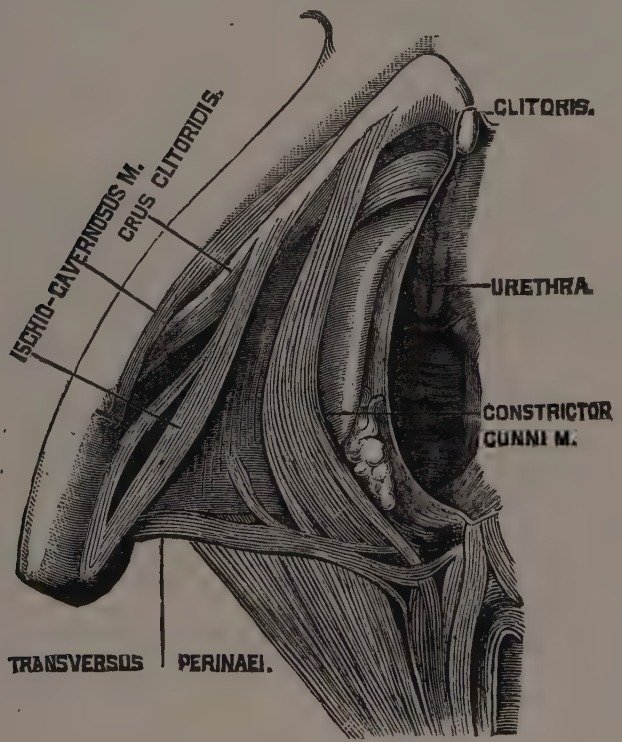


FIG. 23.—Muscles of the Perineum.

The most important muscle which enters into the structure of the perineum is the levator ani. This muscle has a double structure, is attached anteriorly to the inner surface of the bodies and horizontal rami of the pubes, and its lateral halves to the tendinous arches of the pelvic fasciæ, which stretch from the inner borders of the pubes to the ischial spines. From this broad origin the muscle extends downwards and inwards to the sides of the bladder and rectum, and is inserted posteriorly into a tendinous raphe, which extends from the top of the coccyx to

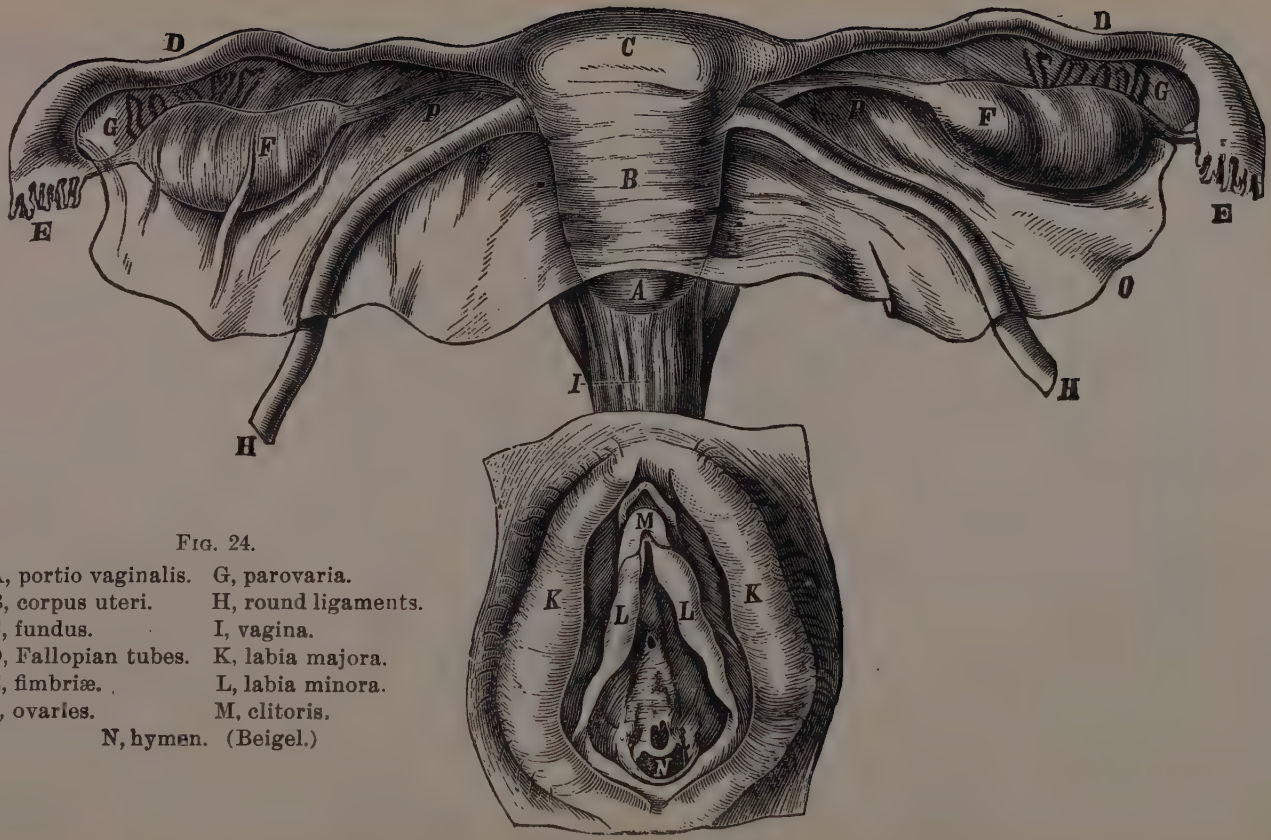


FIG. 24.

A, portio vaginalis.
B, corpus uteri.
C, fundus.
D, Fallopian tubes.
E, fimbriæ.
F, ovaries.
G, parovaria.
H, round ligaments.
I, vagina.
K, labia majora.
L, labia minora.
M, clitoris.
N, hymen. (Beigel.)

the rectum. The fibers extending to the rectum become blended with those of the external sphincter, while those in relation with the vagina are situated beneath the bulbs of the vestibule, and the constrictor cunni. The ischio-coccygeus, a small muscle, is by some included in a description of the levator ani. It requires no detailed notice.

The levator ani and coccygei muscles are of nearly membranous thinness, and derive their chief strength from the strong tissues of the internal pelvic fascia, with which they are brought into close union.

The other muscles which contribute to form the pelvic floor are of less obstetric importance. They are chiefly the ischio-cavernosi, the constrictor vaginæ, and the transversi perinæi. The ischio-cavernosi muscles form a sheath about the crura of the clitoris The constrictor vaginæ is made up of two small lateral muscles which lie upon the outer side of the vestibular bulbs, and surround the vulvar orifice. The transversi perinæi muscles are small, triangular and thin, extending from the inner sides of the ischia, underneath the constrictor muscle to the sides of the vagina and rectum.

It remains to be said of the perineal body that it occupies, as stated, the space between the vagina and rectum, and in a sagittal section presents a triangular shape as shown in figure 22. It extends up the recto-vaginal septum nearly half the length of the vagina.

The functions of the perineum are chiefly two: (1) to close the lower outlet posteriorly, so as to prevent prolapse of the pelvic viscera; (2) to admit of distension of the vulvar opening, when necessary, in such a manner as to produce only temporary dilatation.

CHAPTER IV.

THE FEMALE INTERNAL GENERATIVE ORGANS.

The Uterus.—About this wonderful organ more obstetric interest centers than about any other in the female economy. It is pear-shaped, flattened somewhat antero-posteriorly, and bent slightly on its longitudinal axis, its concavity looking forwards.

In the virgin the organ differs in shape and size from that in the woman who has borne children. The nulliparous uterus

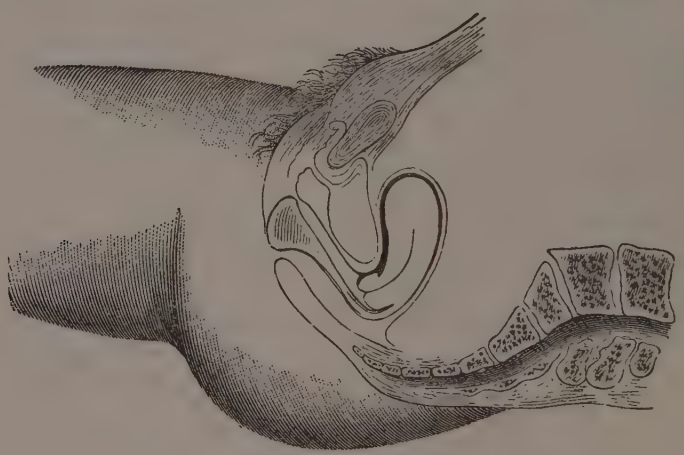


FIG. 25.—Normal position of the Uterus, with empty Bladder.

varies in length from two to two and a half inches. Its average breadth at the widest point is about one and a half inches, while its thickness is about three quarters of an inch.

Richet gives the following dimensions:

	Vertical diameter of cavity. Inches.	Transverse intra-uterine diameter. Inches.
Virgins	1.7	.5
Nulliparæ	2.0	1.0
Multiparæ	2.3	1.2

Its average weight is about 630 grains.

Its upper border is moderately convex, and its lateral borders are convex above and concave below. At the points of

junction of the lateral and superior borders, being the angles or cornua, the Fallopian tubes join the organ. The lower portion of the organ is spindle-shaped, and has a width of say three-quarters of an inch.

By reason of its peculiar form the uterus is naturally divided into two portions of nearly equal length. The lower portion is called the cervix, or neck. The upper portion is subdivided, and that part lying below the Fallopian tubes is known as the corpus, or body, while that situated above the Fallopian tubes is distinguished as the fundus.

The lower part of the cervix is embraced by the upper extremity of the vagina, and this intravaginal end of the cervix is known as the *vaginal portion*. The remainder of the cervix, which lies above or without the vagina, is distinguished as the *supravaginal portion*. At the lowermost extremity of the cervix there is a slightly transverse aperture, called the external os, or os tincæ. In nulliparæ it is very small, measuring not more than two lines in width, and sometimes scarcely admitting the point of a small uterine sound. This uterine mouth is provided with two thick rounded lips, the anterior being a little the longer.

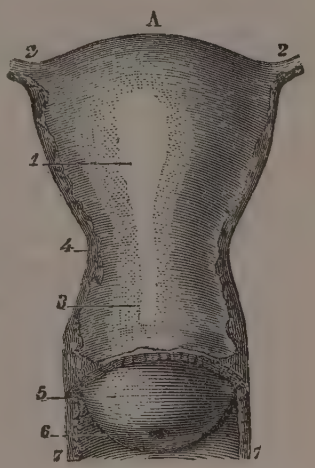


FIG. 26.—Anterior view of Virgin Uterus (Sappey). 1, body. 2 2, angles. 3, cervix. 4, site of os internum. 5, vaginal portion of cervix. 6, external os. 7 7, vagina.

In the adult female the uterus is situated in the true pelvis, between the bladder in front and the rectum behind. What we mean to say is, that in the non-pregnant condition it is wholly within the pelvic cavity, the fundus being below the plane of the superior strait.

The mechanism by which the organ is held in position should be thoroughly understood. Lying, as it does, approximately in the axis of the pelvic canal, it is to a certain extent supported by the vaginal walls and columns, while the latter derive much of their supporting power from the perineal body.

THE UTERINE LIGAMENTS, from their peculiar arrangement, give to the organ considerable freedom of movement, yet serve to prevent serious deviations of position or situation. Most of

these are formed by folds of that great serous membrane which wraps the pelvic viscera, namely, the peritoneum. This membrane, after covering part of the posterior surface of the bladder, is reflected upon the anterior face of the uterus, overlying the greater part of its superficies. It then passes over the fundus uteri, and down the posterior surface, dipping to a considerable depth, and forming, posteriorly to the upper part of the vagina, a serous pouch, bounded laterally by folds of the peritoneum. This pouch is the cul-de-sac of Douglas, and the folds of peritoneum which form its lateral boundaries are the retro-uterine, or utero-sacral ligaments. Anteriorly to the uterus—that is, between the uterus and bladder—is a shallow pouch with similar ligamentous boundaries formed by the peritoneum, the latter being known as the vesico-uterine ligaments. The peritoneum being a broad sheet, or apron, forms by its duplicatures, as it passes over the pelvic organs in the manner described, broad folds upon both sides of the uterus, stretching from this organ to the pelvic wall, known as the *ligamenta lata*, or *broad ligaments*. These divide the pelvis into two cavities—the anterior of which lodges the bladder, and the posterior the rectum. The superior margin of the broad ligament is free, and extends from the angle of the uterus to the pelvic wall. The two serous folds which constitute the broad ligament are separated by a loose, and very extensible, lamellated cellular tissue, continuous with the proper surfaces of the pelvis.

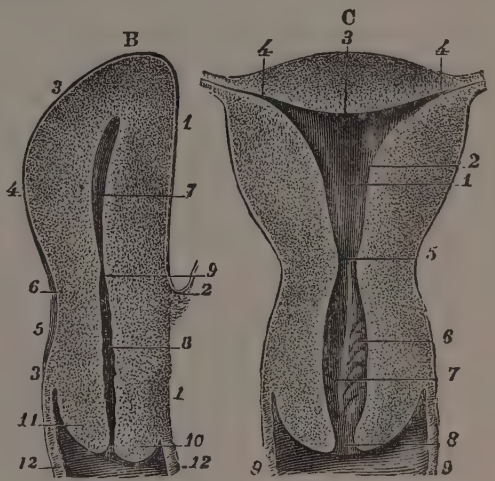
The broad ligaments disappear during gestation, their two laminæ assisting to cover the anterior and posterior surfaces of the enlarged uterus.

The *round ligaments*, or supra-pubic cords, are structures which differ entirely from those just described, being evidently continuous with, and similar in character to, the uterine tissues. They arise from the upper border of the uterus, and extend transversely, and then obliquely, downwards, until they pass through the inguinal rings, and blend with the cellular tissue of the mons veneris and labia. In passing through the inguinal rings each is invested with a peritoneal sheath called the *canal of Nuck*. Their upper portion is made up solely of the unstriped variety of muscular tissue; but, as they descend, they receive striped fibers from the transversalis muscles, and the columns of the inguinal rings. They also contain elastic and connective tissue, and arterial, venous and nervous branches, the first being de-

rived from the iliac or cremasteric arteries, and the last from the genito-crural nerve.

The uterus thus held by its ligaments is in a freely mobile state, such being nature's wise provision to protect the organ from injury which it might otherwise receive through violent physical exertion, falls, jars, and other disturbing occurrences. As previously stated, its longitudinal axis corresponds pretty closely with the axis of the pelvic canal, but the fundus of the organ in most cases is slightly inclined to the right.

THE UTERINE CAVITY.—Lateral section of the organ discloses a cavity in form somewhat like the uterus viewed as a whole. Its width at the superior angles, where minute orifices mark the openings of the Fallopian tubes, is greatest, while the narrowest point is at the junction of the body and cervix, at which place is the uterine isthmus. The cavity is here a very narrow passage, distinguished as the internal os. Between this point and the os tincæ there is a wider channel, known as the cervical canal. An antero-posterior section reveals but a small cavity, with the anterior and posterior walls lying in contact.



FIGS. 27 AND 28.—B, Median section of Virgin Uterus. C, transverse section (Sappey). B 1 1, profile of the anterior surface. 2, vesico-uterine cul-de-sac. 3 3, profile of posterior surface. 4, body. 5, neck. 6, isthmus. 7, cavity of the body. 8, cavity of the cervix. 9, os internum. 10, ant. lip of os externum. 11, posterior lip. 12 12, vagina. C 1, cavity of the body. 2, lateral wall. 3, superior wall. 4 4, cornua. 5 os internum. 6, cavity of the cervix. 7, arbor vitæ. 8, os externum. 9 9, vagina.

STRUCTURE OF THE UTERUS.—Three principal tissues enter into the composition of the uterus, namely, peritoneal, muscular, and mucous. The manner in which the peritoneum invests the organ has been described with sufficient minuteness for practical purposes. A good part of the entire area of this organ is covered by it. The investment at the sides is less extensive

than elsewhere, since the peritoneal folds separate a short distance below the Fallopian tubes, and there the nerves and vessels which supply the organ gain entrance. The peritoneum, as it covers the upper portion of the uterus, becomes firmly adherent to it, while below it is more loosely connected.

The Muscular Structures.—The proper tissue of the uterus is of a grayish color, and is very dense in structure, creaking like cartilage under the scalpel. The cervix is generally less firm than the body, a condition resulting, as Mr. Cruveilhier believes, from the body and fundus being the more frequent seat of sanguinous fluxions. Under physiological as well as pathological conditions, the tissue presents a more marked redness, and is more supple.

The uterine tissue is clearly fibrous in character, but the nature of the fibers has been a subject of spirited debate. The microscope appears to have ended the dispute by showing them to be clearly muscular. This is further shown by the development that takes place during pregnancy, the uterine muscular fiber becoming large and powerful. It is certain, then, that the proper uterine tissue is chiefly muscular, but the fibers in the non-pregnant organ are condensed or atrophied, so that their true character is in a measure concealed. In the latter condition of the organ, the direction of its muscular fibers cannot be satisfactorily made out. They cross and recross, as every examiner has found, in an almost inextricable manner.

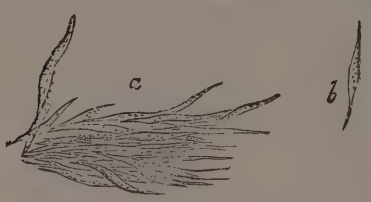


FIG. 29.—Muscular fibers of unimpregnated Uterus (Farre). *a*, fibers united by connective tissue. *b*, separate fibers and elementary corpuscles.

An attempt has been made to divide the muscular fibers into three layers, namely, (1) one in which the fibers take a longitudinal direction; (2) another wherein they are circular, and (3) a third in which they run obliquely. After patient study and research, Bayer arrived at the following conclusions:

1. The fundus is composed of—

(*a.*) A superficial layer, the medium longitudinal fibers of which pass from before backwards, while the lateral fibers are arranged in whorls around the insertions of the oviducts. These whorls pass from left to right around the right tube, from right to left around the left tube, compared with the direction

in which the hands of a watch move. A hood-like covering is thus formed, probably arising from the external longitudinal layer of the oviduct, and of the round ligament.

(*b.*) Of the deepest, or submucous layer, arranged in the same manner as the above, and derived from the internal longitudinal fibers of the oviduct.

(*c.*) Of a middle layer, which is derived from the round and from the ovarian ligaments, a broad band, anteriorly and posteriorly, on both sides of the median line, passing in a sagit-

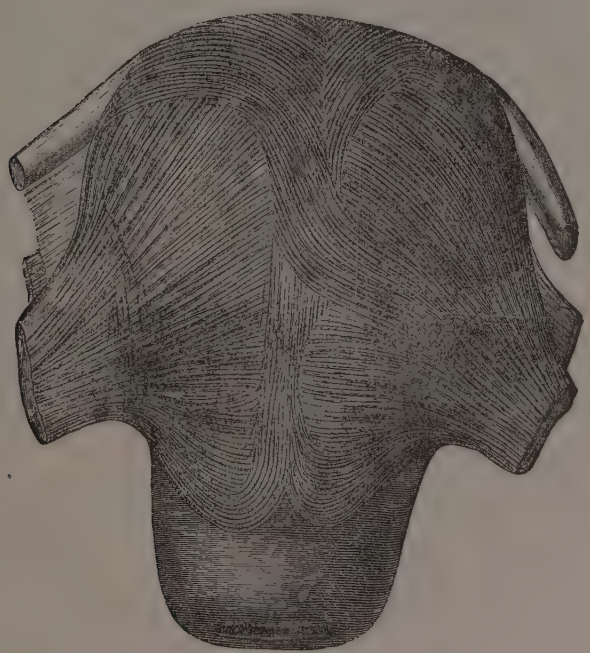


FIG. 30.—External Muscular Fibers of the Uterus.

tal direction. This is interlaced with transverse bands from the circular fibers of the oviducts. Fibers from the ovarian ligament, in connection with the latter, surround the horns of the uterus in spirals and obliquely placed circulars.

2. The posterior wall is formed by the circular fibers of the oviduct, by diagonal lamellæ from the ovarian ligament, which pass inwards from above, and, finally, by the eccentric rings coming from the retractors, which penetrate all the layers. In this description the most superficial and the deepest longitudinal fibers originating from the oviducts, and which

unite to form anteriorly and posteriorly a triangular muscle, are omitted.

3. The middle part of the anterior wall may be divided into an external longitudinal layer, which arises from the muscular fibers of the round ligament, united with the longitudinal fibers from the oviduct; a middle layer formed by the union of circular fibers from the oviduct with the anterior rings of the retractors, and an internal longitudinal layer formed by the crossing anteriorly of the inner longitudinal fibers of the oviducts.



FIG. 31.—Inner Muscular Fibers of the Uterus.

4. In the lower part of the body the greater part of the walls is formed by muscular bands from the round ligaments.

5. In the internal and external portion of the cervix, longitudinal fibers, which are the continuation of the corresponding layers of the corpus, anteriorly and posteriorly pass in the median line. Besides these, the posterior wall of the cervix essentially consists of eccentric rings of the retractors, the interlacing fibers of which form other parts, and finally of fasciculi from the ovarian ligaments, which after passing longitudinally are inflected.

In the anterior wall of the cervix only muscular lamellæ, running diagonally toward the mucous membrane, and covering each other like the tiles of a roof, can be recognized; the fibers of the retractors are found more especially in the lower third, forming a compact muscular mass from interlacing with the radiating fibers from the round ligament.

The Mucous Surface.—The existence of any mucous membrane whatever on the inner surface of the uterus has been

questioned by a number, and even recently by Dr. Snow Beck, who insists that what has been so regarded is nothing more nor less than softened proper uterine tissue. Authorities in general, however, do not concur in this belief, but agree that it is essentially a mucous membrane, differing from mucous membrane in other parts chiefly in being more intimately associated with the subjacent structures, in consequence of possessing no definite connective tissue frame-work of its own. Its color is pale pink. Its thickness varies considerably in different parts. Towards the middle of the body it constitutes about one-sixth of the thickness of the entire uterine walls, being from one-twelfth to one-twenty-fifth of an inch. Like the uterine walls themselves, it thins off rapidly towards the internal os below and the Fallopian tubes above. Within the cervix the uterine mucous membrane loses many of its characteristics. On the anterior and posterior surfaces of the canal is a prominent perpendicular ridge, with one less distinct on each side, from which extend ridges at acute angles. These, from their appearance, have been called the *arbor vitæ,* penniform rugæ, and palmæ plicatæ. Like the vaginal rugæ, they are most distinct in virgins, and are indistinct after childbearing. The mucous surface of the uterus in a normal condition is covered with a thin layer of transparent alkaline mucus.

The Uterine Glands.—With the aid of a strong glass, the general structure of the uterine mucous membrane is clearly seen. It is made up in part of connective tissue, which is directly continuous with the connective tissue of the muscular coat, in which, as a bed, are a large number of tubular, or utricular, glands. About forty-five of them are contained in a space one-eighth of an inch square. These glands have a sinuous course, often divide below into two or three separate blind extremities, and are about $\frac{1}{220}$ of an inch in diameter. As a rule they penetrate the entire thickness of mucous membrane, and in some instances even dip into the muscular tissue. Their basement membrane is composed of spindle-shaped cells, which dovetail into one another. Their free surface is covered with cylindrical cells, possessing ciliæ. The mucous membrane itself possesses an epithelial covering, of the ciliated variety, which is believed by some to produce a current in the direction of the Fallopian tubes.

The glands of the cervix (glands of Naboth) cover the

entire area of the cervical canal, from the internal os to the borders of the external. They differ from those found within the uterine cavity. Like them they are cylindrical, but terminate in a rounded *cul-de-sac*, lentil-shaped. These glands are so numerous that, according to Dr. Tyler Smith, "on a moderate computation, under a power of eighteen diameters, ten thousand mucous follicles are visible in a well developed nulliparous organ." "These glands," says Dr. Lusk, "are, genetically considered, simple inversions of the mucous membrane, and are lined by ciliated epithelium."



FIG. 32.—Section through Uterus, showing cavity, *a*, and glandular structures, *d*. (Heber.)

Obstruction of the neck of these glands gives rise to straw-colored vesicles, which have been called the ovula of Naboth. The penniform rugæ give to the cervical canal an extensive secretory surface, which furnishes an alkaline mucus.

The Vessels of the Uterus.—The uterus receives its blood from two sources, namely, (1) the two ovarian, or spermatic, arteries, and (2) the two uterine. The origin of the ovarian arteries is about two and a half inches above the aortic bifurcation. They pursue a serpentine course, descending obliquely downwards under the peritoneum to the pelvic cavity, and then ascending between the folds of the broad ligaments. They then reach by their main trunks the sides of the uterus, and communicate with the uterine arteries. The uterine arteries are derived from the hypogastric. Their course is at first to the vaginal fornix, where they give the "vaginal pulse." Thence they curve upwards between the folds of the broad ligament, and pass in a tortuous course over the lateral borders of the uterine cervix and body. By means of a circumflex branch at the junction of cervix and corpus uteri, the arteries of each side communicate.

The veins of the uterus are valveless, but, by anastomosis, they form a network through all the uterine tissues. They are so intimately related to the latter that they remain open after

section. During pregnancy they enlarge to form "sinuses." The blood, collected by the veins, is carried into two venous plexuses, namely, the *uterine* and *pampiniform*. The latter returns blood from the uterus, Fallopian tubes and ovaries, but the former from the uterus only.

The Uterine Nerves.—Frankenhaeuser says that the nerves of the uterus are derived from the gangliated cords of the sympathetic system, through the medium of the hypogastric and cervical plexus, and by means of which important connections are formed with all the abdominal viscera. The nerves supplied to the organ, when examined without the aid of a lens, are soon lost to sight in the uterine walls; but in microscopic preparations, Frankenhaeuser has traced their ultimate filaments to the muscular element, where they appear to terminate in the nuclei of the fiber-cells. Notwithstanding the denial of some anatomists, it is now generally conceded that the cervix is supplied with numerous filaments, even to the os tincæ.

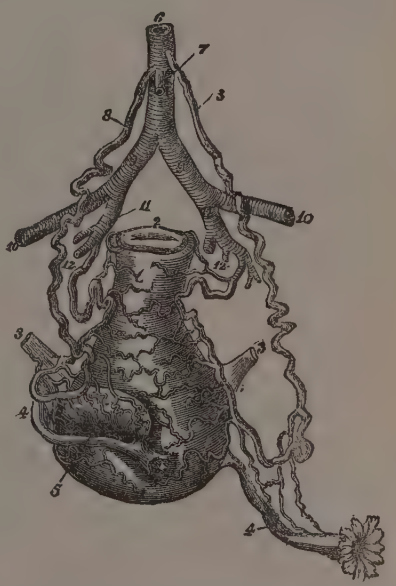


FIG. 33.—Arterial Vessels in a Uterus ten days after Delivery. The posterior aspect is shown. 1, fundus uteri. 2, vaginal portion. 3 3, round ligaments. 4 4, Fallopian tubes. 5, right ovary. 6, abdom. aorta. 7, inf. mesenteric art. 8 8, spermatic arteries. 9, common iliac. 10, ext. iliac. 11, hypogast. art.

From experiments on rats, mice, rabbits, etc., Rein concludes that there exists an essential nervous plexus, lying outside of the uterus, mainly in the cellular tissue surrounding the vagina at the point where the hypogastric plexus anastomoses with filaments of the sacro-uterine nerves. Many ganglionic cells are found in it, lying for the most part along the course of the principal nerve branches which go to, and come from, the plexus. The upper limit of these cells is at the beginning of the tubes; the lower limit is lost in the vaginal plexus. No fiber, either from the hypogastric plexus or from the sacral nerves, goes to the uterus without first passing through the uterine plexus.

The Lymphatics.—Lymph-spaces abound in the uterine tissues, and regular lymphatic vessels are found in the connective tissue about the arterial trunks in the parenchyma. Beneath the peritoneum is found a real network of these vessels. Large receiving vessels lie just beneath the external muscular layer on

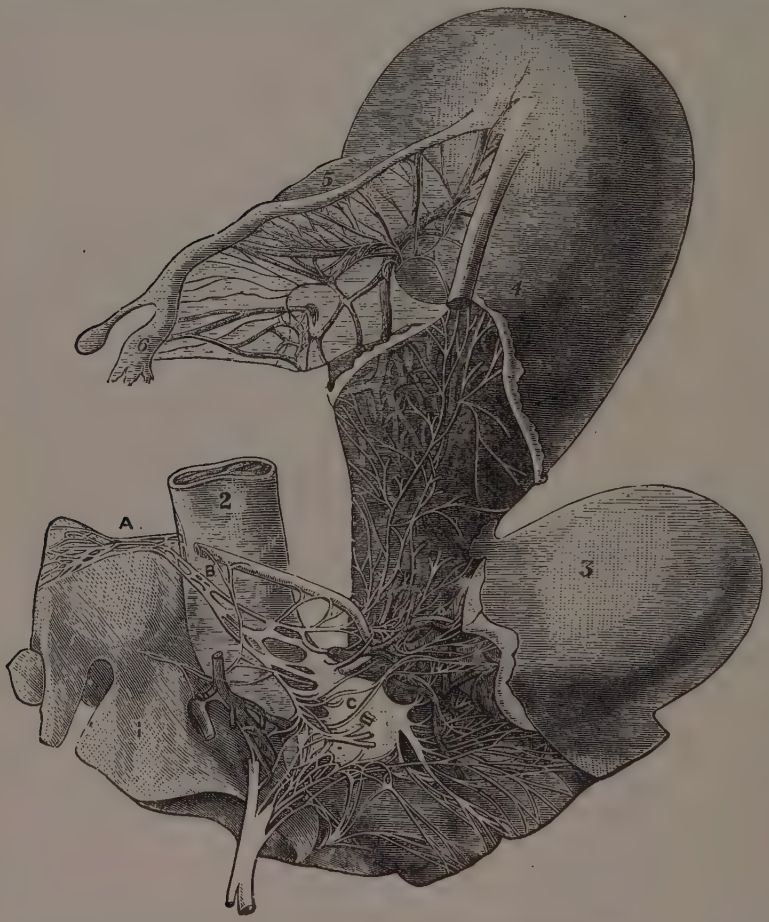


FIG. 34.—Nerves of the Uterus. A, plexus uterinus magnus. B, plexus hypogastricus. C, cervical ganglion. 1, sacrum. 2, rectum. 3, bladder. 4, uterus. 5, ovary. 6, extremity of Fallopian tube. (Frankenhaeuser.)

either side of the organ, into which the lymph from both the subserous and uterine vessels is poured. The lymphatics of the cervix pass to the glands of the pelvic cavity.

Development.—In the embryo the uterus is formed by the fusion of the two ducts of Müller, or the efferent tubes of the

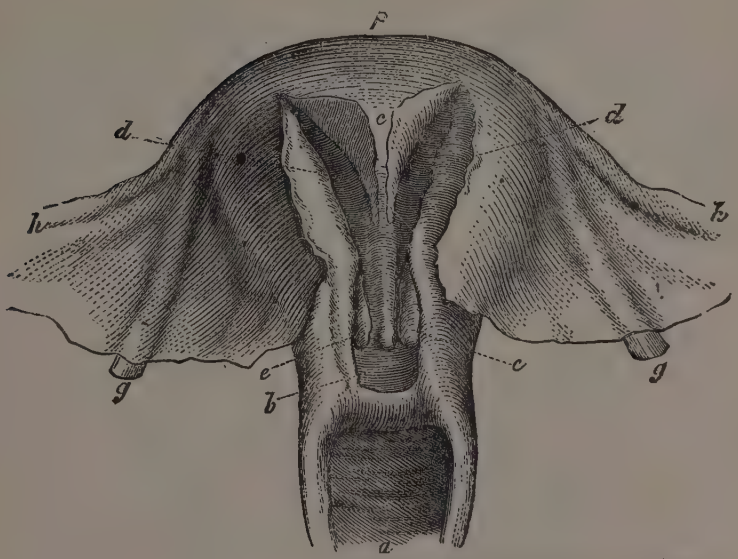


FIG. 35.—Uterus with double cavity, and slight deviation of form.

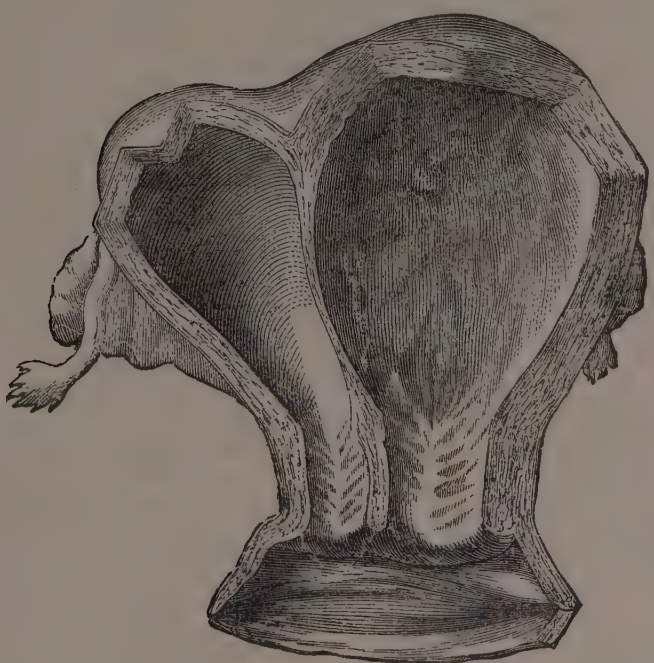


FIG. 36.—Uterus Septus Bilocularis. Double uterus, with single vagina, seen from the front. Left walls more developed in consequence of pregnancy. (Cruveilhier.)

rudimentary generative apparatus. Upon thus uniting, the partition between the two is absorbed, and the organ is then left but a single cavity. In different stages of development there is accordingly an organ of varying shape.

ABNORMALITIES OF THE UTERUS.—The various abnormal conditions of the uterus and vagina which are occasionally met

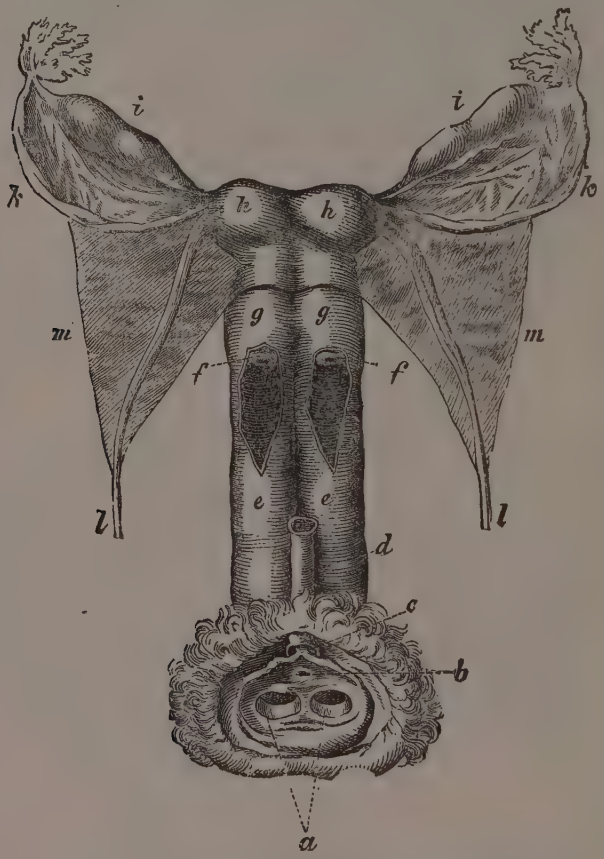


FIG. 37.—Double Uterus and Vagina from a Girl Aged Nineteen (Ersenmann). *a*, double vaginal orifice with double hymen. *b*, meatus urethræ. *c*, clitoris. *d*, urethra. *e e*, the double vagina. *f f*, uterine orifices. *g g*, cervical portions. *h h*, bodies and cornua. *i i*, ovaries. *k k*, Fallopian tubes. *l l*, round ligaments. *m m*, broad ligaments. (Courty.)

are, in the main, the result of arrested development. After the canal or ducts of Müller have united to form the rudimentary uterus, if the partition should remain, the result will be a double or bifid uterus. This may be true of an organ present-

ing little difference in form from that of the normal uterus, as shown in figure 35, or the organ may present an external appearance which corresponds to its internal anomalies, as in figure 36. The partition may not exist alone in the uterine cavity, but extend downwards, to form a double vagina as well.

The following constitute the main varieties of abnormalities:

1. The Uterus Unicornis, or single-horned uterus.—In that case the organ presents but a single lateral half, and generally has but one Fallopian tube. 2. The Duplex Uterus.—Two distinct uteri are produced, each of which represents a half of the normal uterus. 3. The Uterus Bicornis.—This results from partial union of the ducts of Müller, giving to the upper part of the organ two horns, divided by a furrow. 4. The Uterus Cordiformis.—This, as its name indicates, presents the form of a heart as ordinarily represented on playing cards. 5. The Uterus Septus Bilocularis.—Union in this case is complete, but the septum persists as represented in figure 36.

CHAPTER V.

THE FEMALE INTERNAL GENERATIVE ORGANS—Continued.

The Fallopian Tubes, or OVIDUCTS.—These are the homologues of the vasa differentia of the male. They are the infundibula or ingluvies which take up and convey the ova from the ovaries to the uterine cavity, as well as transmit to the ovaries the fecundating principle of the male. They measure from three to four inches in length, and extend from the upper angles of the uterus to the ovaries. Their course is along the upper margins of the broad ligaments, being covered by peri-

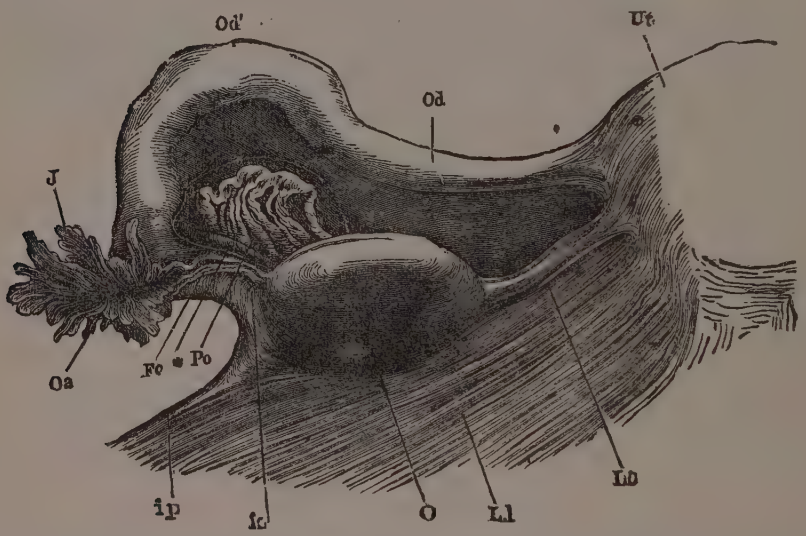


FIG. 38.—Ovary and Fallopian Tube. *o d*, Fallopian tube. *o*, ovary. *o a*, fimbriated extremity of the tube. *p o*, parovarium.

toneum similarly to the uterus. They may justly be regarded as integral portions of the latter organ. The Fallopian tubes are trumpet-shaped, and terminate near the ovaries in a comparatively broad, fringed end, called the *fimbriated extremity*, or morsus diaboli. This free extremity communicates with the peritoneal cavity. One of the fimbriæ is attached to the outer angle of the ovary by a fold of peritoneum. It is supposed that during the menstrual nisus the fimbriæ apply themselves

firmly to the ovary, in order to receive the escaping ovule. These tubes are in the upper part of the broad ligament, where they can be felt as hard cords. The uterine extremity of the tube presents an opening known as the ostium uterinum, which, owing to its small size, will scarcely admit a bristle.

The tubes are so remarkably movable that they are not only capable of applying themselves to those parts of their respective ovaries from which the ovule is to come, but, as is now believed, to stretch themselves to opposite sides to receive an escaping ovule.

In some cases there are found to exist supernumerary fimbriated extremities which communicate with the tube at some distance from the main extremity. In the bodies of twenty women, selected at random by M. Gustave Richard, this anomaly was found five times.

The walls of the tubes are provided with a peritoneal, a muscular and a mucous coat,—the muscular predominating.

The last is arranged in two layers—one longitudinal and the other circular. By virtue of these the tubes have a vermicular or peristaltic action. Between the muscular and peritoneal layers is a web of connective tissue, which gives support to a rich plexus of blood-vessels. The mucous membrane lining the cavity of the tube is highly vascular, and is provided with ciliated epithelium, which is said to produce a current in the direction of the uterus.

The Ovaries.—These are regarded as the essential organs of generation in the female, since they provide the germ which is made fruitful by contact with the male fecundating principle. They are the analogues of the testes, and, up to the time of Steno, were called "testes mulieris." They are situated on either side of the uterus, within the pelvic cavity, and are attached to that organ by muscular bands about an inch long, called the ovarian ligaments. They are small, oval, flattened bodies, broader at the end distant from the womb, their measurements being about an inch and a half long, about three-quarters of an inch in breadth, and three-eighths to half an inch in thickness. They are situated between the layers of the broad ligaments, the posterior layer being reflected over the entire organs, save at the attached borders, at which points openings exist for transmission of the spermatic vessels. They lie beneath, and somewhat behind, the fimbriated extremities of the Fallopian tubes.

Besides the peritoneal coat, they have beneath it another, the *tunica albuginea*. This covering is so intimately adherent to the subjacent tissues that it cannot be stripped off. In the first three years of life it is entirely absent.

Beneath the albuginea the parenchyma of the organ has an outer *cortical* and an inner *medullary substance*. The former is of grayish color, and is made up of interlaced fibers of connective tissue, containing a large number of nuclei. It is in this structure that the Graafian follicles and ovules are found. The latter exist in immense numbers in various stages of development, from the earliest periods of life. The stroma of the cortical substance is at no place sharply distinguished from that of the medullary. The medullary substance has a reddish color, given it by its numerous vessels. It consists of loose connective tissue, with some elastic, and muscular. Rouget and Kis claim that the greater part of the ovarian stroma is formed of muscular tissue.

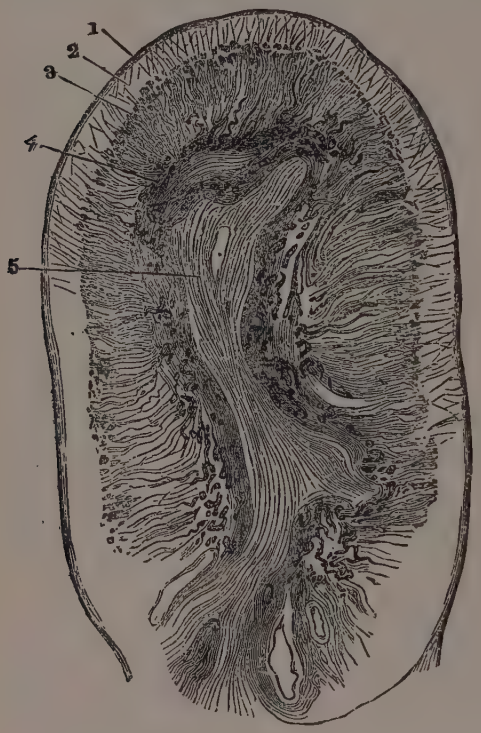


FIG. 39.—Longitudinal Section of an Ovary from a Girl Eighteen Years Old. 1, albuginea. 2, fibrous layer of cortical portion. 3, cellular layer of cortical portion. 4, medullary substance. 5, loose connective tissue.

THE GRAAFIAN FOLLICLES, or OVISACS.—The Graafian follicles are formed at an early period in fœtal life, by cylindrical indigitations of the epithelial covering of the ovary, which sink into the substance of the gland. Portions in this manner become infolded from the rest of the tubules, and form the Graafian follicles. The ovules are developed from the epithelial cells which

line the tubules, derived primarily from the surface of the ovary.

The number of the Graafian follicles is immense, the ovary at birth being estimated by Foulis to contain not less than 30,000, and by Henle 36,000. The ovary at birth contains its full quota of follicles, and, during the menstrual epoch, development and destruction are constantly going on. Of course, but

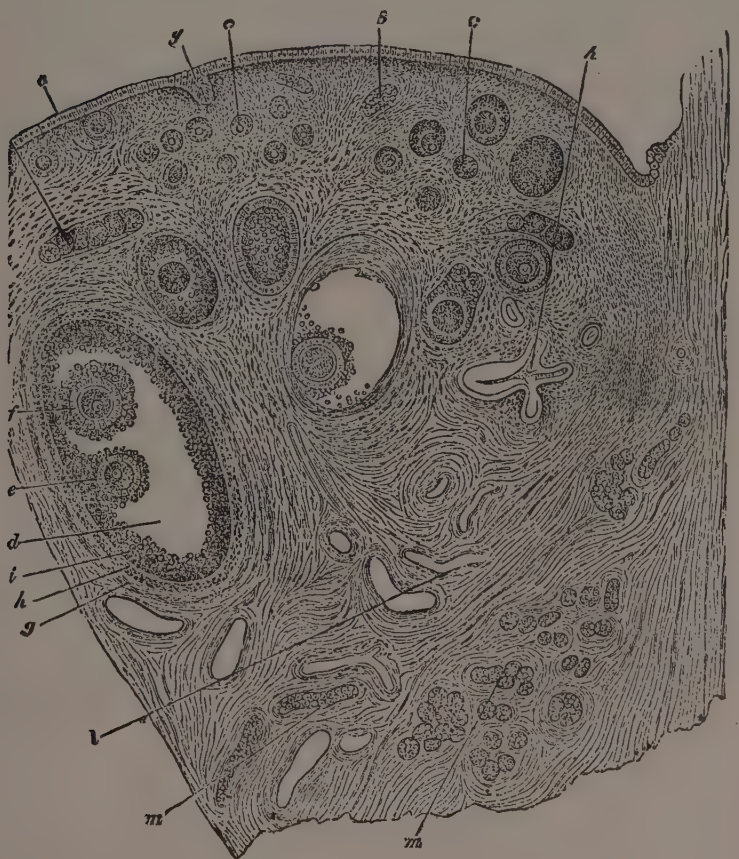


FIG. 40.—Portion of Vertical Section through Ovary of Bitch. *a*, epithelium of ovary. *b b*, tubules of ovary. *c*, young follicles. *d*, mature follicles. *e*, discus proligerus, with ovum. *f*, epithelium of second ovum in same follicle. *g*, tunica fibrosa folliculi. *h*, tunica propria folliculi. *i*, membrana granulosa. (Waldeyer.)

a small proportion of the entire number ever reach maturity. Few of these follicles are visible to the naked eye, but under the microscope all come plainly into view.

The structure of a mature Graafian follicle is, 1, an investing membrane, consisting of two layers. The external, or tunica fibrosa, is formed of connective tissue, and is highly vascular. The internal, or tunica propria, is also composed of connective tissue, but contains a large number of fusiform cells and numerous oil globules. These two layers are really formed of condensed ovarian stroma. 2, The membrana granulosa, consisting of stratified columnar epithelial cells. Near the circumference of the ovisac is the ovule, around which are congregated a large number of epithelial cells, forming what is known as the discus proligerus. Transparent fluid fills the remainder of the follicle, with three or four bands, or retinacula of Barry, stretching through it, and attached to the opposite walls of the cavity. In some young follicles the ovule fills the entire cavity.

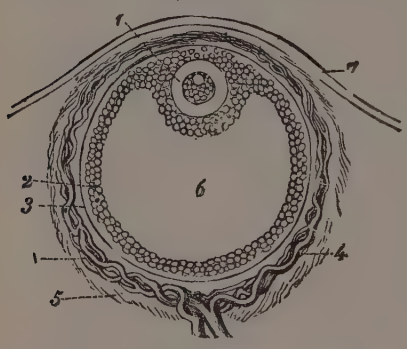


FIG. 41.—Diagrammatic section of Graafian Follicle. 1, ovum. 2, membrana granulosa. 3, external membrane of Graafian follicle. 4, its vessels. 5, ovarian stroma. 6, cavity of Graafian follicle. 7, external covering of ovary.

The Ovule.—The ovule is a rounded vesicle, about $\frac{1}{120}$ of an inch in diameter. At the time of its discharge from the ovary it is no longer a simple cell, composed of ordinary protoplasm, but presents the following characteristics: It has a thick, transparent envelope, termed the *vitelline membrane,* or *zona pellucida.* The body of the cell is the *vitellus,* or yolk. It possesses the properties of ordinary protoplasm, has a viscid consistence, and is opaque from the presence of very fine granules and globular vesicles. The nucleus of the cell becomes converted into a large, clear, colorless vesicle, called the *germinative vesicle.* The nucleolus persists as a dark, probably solid body, within the germinative vesicle, where it is known as the *germinative spot.* The ovule is attached to some part of the internal surface of the Graafian follicle.

VESSELS AND NERVES OF THE OVARY.—The arteries of the ovary, derived from the internal spermatic, enter at the hilum and penetrate the medullary substance in a spiritual course. The branches freely anastomose, and form an interlacement.

Between the vessels thus connected are spaces, which become smaller as they approach the surface of the gland. The veins begin as radicals, rapidly enlarge, anastomose and form an erectile plexus. Larger veins then convey the blood through channels following the arteries, to the internal spermatic vein.

Lymphatics emerge at the hilus, and are conducted to the lumbar ganglia.

The nerve supply is from the ovarian plexus.

The Intra-Pelvic Muscles.—Certain muscles which encroach upon the pelvic space should be mentioned. The iliac muscles spread over the entire iliac fossæ, but their origin is chiefly marginal. The muscles condense below, pass under Poupart's ligaments, and become united to the psoæ muscles. These muscles cushion the iliac fossæ, and thereby afford a soft

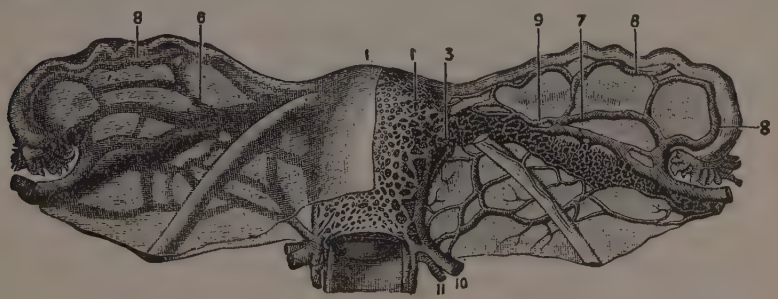


FIG. 42.—Uterine and Utero-ovarian Veins (Plexus Papiniformis). 1, uterus seen from the front; its right half is covered by the peritoneum; upon the left half may be seen the plexus of utero-ovarian veins (internal spermatic). 6, utero-ovarian vessels covered by peritoneum. 7, the same vessels exposed. 8 8 8, veins from the Fallopian tube. 9, venous plexus of the hilum ovarii. 10, uterine vein. 11, uterine artery. 12, venous plexus, covering the borders of the uterus. 13, anastomoses of the uterine with the utero-ovarian vein (int. spermatic).

support for the gravid uterus. The great psoæ and the iliac muscles encroach more or less upon the transverse pelvic diameter at the brim. By virtue of their femoral insertions, they serve as flexors of the thigh; while, in addition, the iliacs act as abductors, and the psoæ as flexors of the pelvis upon the spinal column.

The pyriformis muscles close the sacro-sciatic notches. Their shape is triangular, the base presenting a series of digitations, which find insertion upon the lateral portions of the anterior surface of the sacrum, and the superior margin of the sacro-sciatic ligament. After crossing the greater sacro-sciatic

foramen, and emerging from the pelvis, they terminate in a tendon which is inserted into the great trochanters.

The obturator internus muscle arises from the circumference of the obturator foramen, and the inner surface of the obturator membrane. Its converging fibers form a tendon, which passes out through the lesser sacro-sciatic foramen, and is inserted into the digital fossa of the great trochanter. None of the intra-pelvic muscles occupy much space in the pelvic cavity.

The Mammary Glands.—An account of the *female* generative organs would be incomplete without supplementary reference to the mammary glands. They are two in number, of

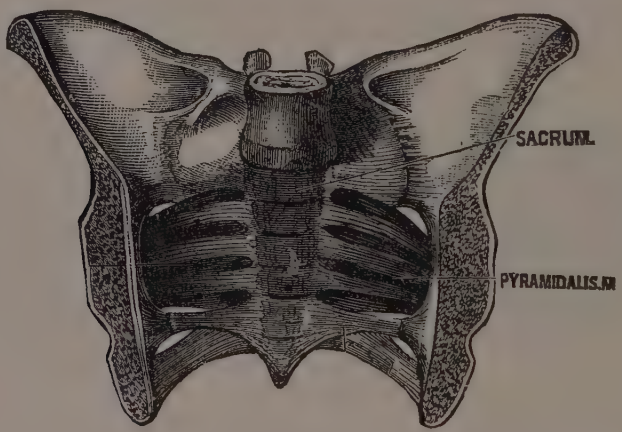


FIG. 43.—Section of Pelvis, showing the Pyramidal Muscles.

the compound racemose variety, are situate on either side of the sternum, between two layers of superficial fasciæ, over the pectoralis major muscles, and extend from the third to the sixth rib. They are convex anteriorly, and flattened posteriorly. Their size varies considerably, chiefly on account of the difference in amount of adipose tissue which they contain. In most women the right breast is larger than the left. Owing to hypertrophy of their glandular structures, during pregnancy they increase greatly in size. Anomalies in number, shape and position are occasionally observed. They are covered with a fine, supple skin, and a layer of adipose tissue, which increases in thickness towards the periphery. The glandular mass is made up of from fifteen to twenty-four lobes, these being subdivided into lobules, constructed of acini, or minute *cul-de-sacs*. The acini open into fine canaliculi, which unite until they form a

large duct for each lobule. These ducts are confluent, forming a still larger canal for each lobe, which opens on the surface of the nipple. The latter canals are known as *galactophorus,* or *lactiferous ducts.* When they reach the space beneath the areola they enlarge to form the sinus of the duct, measuring from one-sixth to one-third of an inch in diameter. In the nipple, their diameter is from one-twelfth to one-twenty-fifth of an inch. The openings on the nipple are from one-sixtieth to one-fortieth of an inch in diameter. The acini are lined with a single layer of small polyhedral cells, becoming more cylindrical



FIG. 44.—Supernumerary Mammæ. (Charpentier.)

near the canalicular ducts. The main channels are lined with low, cylindrical cells, and are provided with non-striated muscular fibers, which contract and produce a free flow of the secretion during lactation.

At the summit of the mamma is a conical projection, varying in diameter from a quarter to half an inch, called the nipple. Its surface is covered with papillæ, between which open the lactiferous ducts. Upon its surface open also numerous sebaceous follicles, the secretions of which protect and soften the integument during lactation. Beneath the skin are muscular fibers, mixed with connective and elastic tissues, vessels, nerves and lymphatics. Irritation of the nipple brings about turgescence and excites muscular action, which causes contraction and hardening.

The Areola is a circle which surrounds the nipple, of a color differing from the other integument. It is pink in virgins, and is provided with from fifteen to thirty follicles, which pour out their secretions to moisten the areola. A band of muscular fibers is found beneath the integument, the action of which,

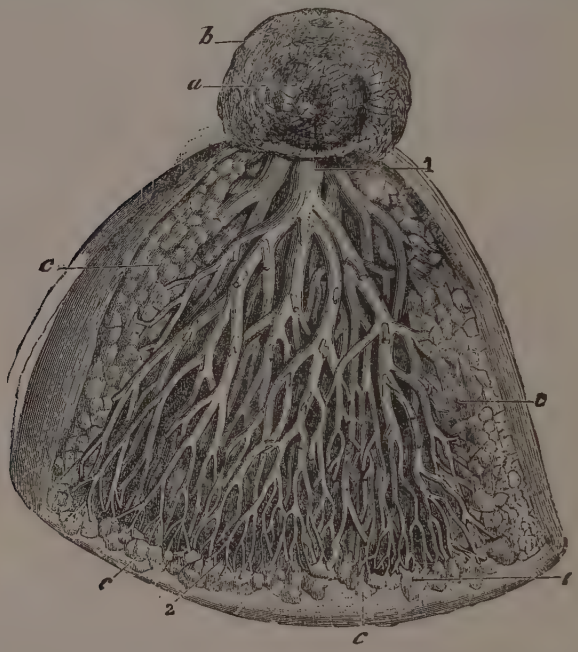


FIG. 45.—Mammary Gland. *a*, nipple, the central portion of which is retracted. *b*, areola. *c c c c c*, lobules of the gland. 1, sinus, or dilated portion of one of the lactiferous ducts. 2, extremities of the lactiferous ducts. (Liegeois.)

when stimulated, is to compress the lactiferous ducts, and thus favor the flow of milk.

The mammæ receive their blood supply from the internal mammary and intercostal arteries, and are provided with lymphatics, which open into the axillary glands.

The nerves are derived from the intercostal and thoracic branches of the brachial plexus.

PART II.

PREGNANCY.

CHAPTER I.

IMPREGNATION AND DEVELOPMENT OF THE OVUM.

Inasmuch as this branch of obstetrics is of theoretical rather than practical value to the student of widwifery, and since the study of it has been diligently pursued by a few, under most favorable conditions, and the results of their investigations have been made the common property of the profession, the author has taken the liberty to draw freely from various authorities on the subject, sometimes in their own words, without, in every instance, giving explicit credit.

The anatomy of the ovary with its Graafian follicles and ovules has already been given. The formation of the Graafian follicles is in the main completed during the ante-natal period of existence. Until about the time of puberty they remain in a quiescent state, but with its advent they begin to assume functional importance. The surface of the ovary, when now examined, is found to be no longer smooth, but studded with small elevations. These elevations are caused by the enlarged Graafian follicles, which have approached the periphery, and being distended by their fluid contents, form rounded, translucent prominences. From disappearance of the blood-vessels and lymphatics at the point of pressure, a weak spot in the wall of the follicle is formed, called the macula or stigma folliculi. The discharge of the ovum is due to the conjoint action of a fatty degeneration of the walls of the mature follicle, and the development of the following changes: The follicle becomes congested, and the vessels coursing over it loaded with blood, while, at the same time, the ovarian covering becomes so thin that the elevation presents a bright red color. Laceration of some of the capillaries in the inner coats takes place, and a certain quantity of blood escapes into the cavity of the follicle. By these means the distension is greatly increased, until at last, under the additional stimulus of sexual excitement, or

without it, rupture occurs, and the ovule is set free. Whether laceration takes place before, during or after menstruation is still an unsettled question. Thinning of the follicular and ovarian walls goes on at one and the same time, and final rupture takes place simultaneously. It is probable that laceration is further promoted by growth of the internal layer of the follicle, which increases in thickness before rupture, and is given a characteristic yellow color by the number of oil-globules which it contains. Contraction of the muscular fibers in the ovarian stroma is also supposed to have an influence in the production of laceration. As rupture occurs, the fimbriated extremity of the Fallopian tube is closely applied to the ovary, receives the freed ovule, and starts it on towards the uterine cavity.

The Corpus Luteum of Menstruation.—At the moment of rupture or immediately after it, an abundant hemorrhage takes place from the vessels of the follicle, by which its cavity is filled with blood. The blood soon coagulates and the clot is retained. The aperture through which the ovule escapes is often not more than one-fortieth of an inch in diameter. If the follicle is now incised longitudinally, it will be seen to form a globular cavity, one-half to three-quarters of an inch in diameter, containing a soft, dark coagulum lying loosely within it. An important change soon begins. The clot contracts and expresses its serum, which latter is absorbed by the neighboring parts. The coloring matter of the blood is also to a great extent absorbed, so that at the end of two weeks a diminution of color is perceptible. The membrane of the follicle becomes thickened and convoluted, and encroaches on the cavity. At the end of three weeks the follicle has become so solidified that, from its color, it receives the name of corpus luteum. It still continues in relation with the ruptured spot on the surface of the ovary, traces of which yet remain. On section at this time it presents the appearance of a convoluted wall and a central coagulum. The coagulum is semi-transparent, of gray, or light-greenish color, more or less mottled with red. The wall is about one-eighth of an inch thick, and of yellowish or rosy hue. The entire corpus may be easily enucleated from the ovarian tissues. After the third week active retrograde changes begin. The whole body undergoes a process of partial atrophy, until at the end of the fourth week it is not more than three-eighths of an inch in its longest diameter. The

color also of its walls has now changed to a clear chrome yellow. After this period the process of atrophy and degeneration goes on rapidly, until at the end of eight or nine weeks the whole body is represented by an insignificant cicatrix-like spot, less than a quarter of an inch in its longest diameter, in which the original texture of the corpus luteum can be recognized only by the peculiar folding and coloring of its constituent parts. It disappears entirely in seven or eight months.

The Corpus Luteum of Pregnancy.—The foregoing shows that the mere presence of the corpus luteum is no evidence that pregnancy has existed, but only that a Graafian follicle has been ruptured and an ovule discharged. There is a difference between the corpus luteum of pregnancy and that of menstruation, and yet the difference is not essential or fundamental. It is, properly speaking, only a difference in the degree and rapidity of their development. It will not be necessary, therefore, to enter upon a lengthy description of the appearances and changes, but only to note some of the more salient points. At the end of the first month, the convoluted wall is bright yellow, and the clot still reddish. At the expiration of two months, instead of being reduced to the condition of an insignificant cicatrix, it is seven-eighths of an inch in diameter. When six months have passed it is still as large as before; the clot has become fibrous and the convoluted wall paler. At the end of utero-gestation, it is about half an inch in diameter; the central clot is but a radiating cicatrix, and the external wall is tolerably thick and convoluted, but has lost its bright yellow color. The corpus luteum of pregnancy is often termed the *true* and that of menstruation the *false*.

The Migration of the Ovum.—But a small portion of the ova in each ovary ever meet with the conditions requisite for fruition. Many ignobly perish in the ovarian stroma, while others, as we learn from the occurrence of extra-uterine pregnancy, are doubtless lost in the abdominal cavity.

The precise conditions which determine the passage of the ovum through the oviduct to the uterine cavity, are still shrouded in obscurity. The theory that by virtue of its erectility the Fallopian tube at the proper moment is brought into relation with the ovary through its fimbriated extremity, is open to criticism, since it has been demonstrated that the tube is not possessed of erectile tissue. Rouget found that injection of its vessels after death did not communicate to it the

slightest change of form or place. Experiments upon the muscular fibers of the tubes has brought no better results, as galvanization produced only vermicular contradictions, which did not affect the position of the fimbriæ. Moreover, when we reflect on the situation and surroundings of these tubes, it becomes difficult to understand how it is possible for them to execute any extended movements. The theory advanced by Henle that the ovum is drawn into the Fallopian tube by currents produced in the serum by the ciliated epithelium, which covers both the external and internal surfaces of the fimbriæ, appears to be gaining favor. Failures of the ovum to enter the tube are probably common.

While the ovum is in the outer portion of the tube, progress is presumed to be made by aid of the ciliæ; but when further advanced on its way to the uterus, additional force is supplied by the circular muscular fibers.

Fecundation.—Conception, fecundation, and impregnation, are terms all of which imply fruitful contact of the male and female elements, so that a new organism comes into existence. The precise point at which this takes place has been the subject of much speculation and research. It has been pretty clearly demonstrated that it cannot be within the uterus, inasmuch as it takes the ovum a period exceeding ten days to reach the uterine cavity, and an unfecundated egg cannot sustain life for so long a time. Abdominal pregnancies seem to prove the possibility of fecundation at the ovary. But, when we reflect upon the rarity of such pregnancies, and the strong probability of the frequent failure of the escaped ovum to enter the Fallopian tube, we are led to infer that fecundation at the ovary is anomalous. Henle has directed attention to the fact that the outer part of the tube, possessing arborescent folds, is especially designed as a receptacle for the seminal fluid. The congested condition of the mucous membrane, its canalicular structure, and the contractions of its muscular fibers, all seem intended to further the intimate contact of the spermatozoa with the ovum after it has reached this situation.

The fecundating principle of the male is secreted in the testes at puberty, and is called the *semen*, or *seminal fluid*. During sexual congress the semen is ejaculated with considerable force by the fibers of the vasa differentia, and the special muscles which surround the vesiculæ seminales and the prostate gland. It thus reaches the upper part of the vagina, and doubtless

sometimes even the cervical canal, from which situation the spermatozoa ascend to the point of contact with the female ovum. It is, however, an established fact that deposit of the seminal fluid deep in the vagina is not essential to impregnation, for pregnancy has been found co-existent with imperforate hymen.

The semen is a thick, glutinous, whitish, albuminous fluid, heavier than water, and emitting a characteristic odor. When placed under a powerful lens it is found to contain small, oval, flattened bodies, measuring not more than $\frac{1}{6000}$ of an inch in diameter, provided with tails which taper gradually to the finest point. The entire spermatozoön measures from $\frac{1}{600}$ to $\frac{1}{400}$ of an inch. These bodies do not passively float in the seminal fluid, but move about with a lashing, undulating motion, as though endowed with volition. The appearance of independent life, which they manifest, was what led Kölliker to compare them to ciliated cells, and gave the erroneous impression that they were animalcules. The name spermatozoa, which they bear, is suggestive. Henle, who has given much study to the subject, has estimated their speed at an inch in seven-and-a-half minutes. It is doubtless to the spermatozoa that the semen owes its fecundating power. Nor is this faculty speedily lost, for examination has demonstrated the vitality and activity of these bodies within the female generative organs, eight and ten days after reception. If then the spermatozoa are absent from the seminal fluid, as in debility or old age, impregnation is impossible, and it is their absence from the seminal fluid of hybrids which renders these animals sterile.

Our knowledge of the process of fecundation is very limited, the fact only being known that the spermatozoa penetrate the vitelline membrane, and then dissolve in the vitellus. Observations on the lower animals appear to prove that penetration of the ovule by one spermatozoön is not only adequate, but constitutes the usual order. Others may gather about, and penetrate a certain depth, but one only enters the protoplasm and creates the vital contact. Various theories of penetration have been advanced. Barry was the first to discover spermatozoa within the zona pellucida of the rabbit's ovum; and his discovery has since been confirmed. Hensen found that the spermatozoa began to penetrate the rabbit's ovum about thirteen hours after coitus.

Barry also discovered an opening in the zona pellucida,

seemingly designed as a point of entrance for the spermatozoa; and Kebler confirmed the discovery.

Robin, who made some very interesting and instructive observations upon the ova of the nephelis vulgaris, or common leech, found that the spermatozoa, in their movements around the ovum, assumed a perpendicular or oblique direction to the vitelline membrane. At one point penetration of this membrane could be distinctly observed. At the end of an hour the penetration had ceased, and then a little bundle of spermatozoa could be seen arrested, partly within and partly without the ovum. They continued to move in the clear, limpid fluid surrounding the vitellus, for a time, but after fifteen or twenty minutes their movements grew slow, and in about two hours had altogether ceased. It was then found, by counting the number remaining and comparing it with that of the spermatozoa which entered, that some had disappeared. They had been absorbed directly into the vitellus, to serve for its fecundation.



FIG. 46.—Spermatozoa.

COURSE OF SPERMATOZOA TO POINT OF FECUNDATION.—The movement of the spermatozoa through the uterus and Fallopian tube is probably effected by various agencies. First: By the undulatory motions of the spermatozoa themselves, although it is difficult to comprehend why these should propel them in any definite direction. Secondly: By the action of the cilia of the epithelium lining the passages. Thirdly: By muscular peristaltic contractions. "It is probable," says Hirst, "that once the spermatozoa have reached the neighborhood of the ovum their movements are controlled by some substance excreted by the egg and diffused in the liquid bathing it. In some of the lower plants (ferns and others) the male elements are motile antherozoids; if a capillary tube containing a weak solution of malic acid be immersed in water containing antherozoids, the latter swim towards the opening of the tube. The malic acid, slowly diffusing through the water, controls the movements of the antherozoids, so that their cilia lash in a manner tending to drive them to the place where there is most malic acid. It has also been found that malic acid is excreted by the female organs of

these plants. Some similar process may occur in the higher animals and lead to a swarming of spermatozoa around the egg." It is highly probable that their usual course is not through the channel said by Mauriceau, De Graaf, and others, to exist in the uterine walls.

CHANGES IN THE OVUM AFTER FECUNDATION.—It should be premised that our knowledge of what takes place in the ovum of the human female is derived mainly from analogy; but from the studies in comparative physiology diligently prosecuted by a few, it is quite probable that the changes described in the following pages are worthy of credence.

One of the earliest changes which has been observed is the disappearance of the germinal vesicle. This may occur, however, whether fecundation has taken place or not; but, in an

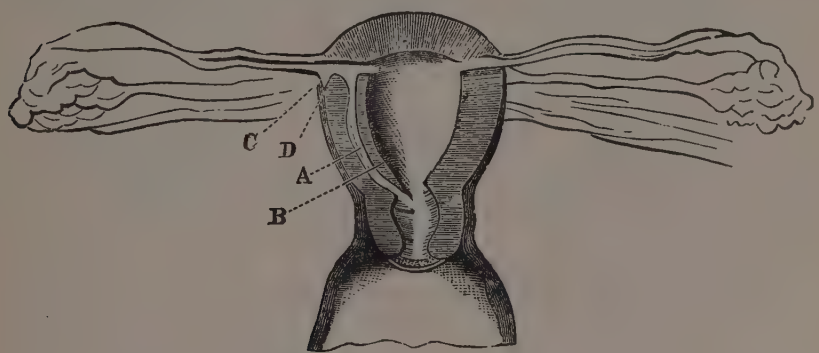
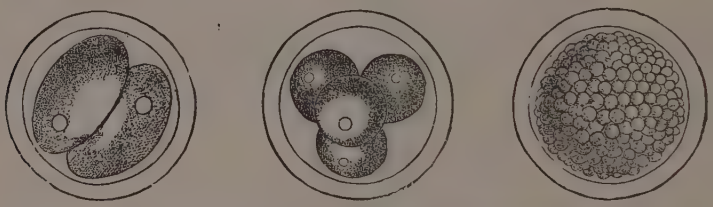


FIG. 47.—Bifurcation of Tubal Canal. (Hennig.)

impregnated ovum, the embryo cell is formed in its place. Inasmuch as the entire time consumed in the migration of the ovum to the uterine cavity is upwards of ten days, it is assumed that some of these changes take place while yet it occupies the outer third of the Fallopian tube. In this part of the oviduct the zona pellucida becomes somewhat thickened, the germinal spot disappears, and its place is supplied by the embryo cell, while the vitellus becomes somewhat condensed. Before the egg enters the uterine cavity, more remarkable changes begin by segmentation, or cleavage of the yolk. Their first step is the formation of a deep furrow, which, by extension, soon completely divides the yolk. These halves are likewise divided by a similar process, so that four spheres result. Nor does the segmentation stop here, but it goes on until the entire yolk has been converted into a finely granular mass, resem-

bling in that particular the mulberry. It should be understood that this segmentation also includes the embryo cell, or nucleus, so that every granular cell resulting from the subdivision retains the elements of the original vitellus. From this germ morula, or mass, the whole organization of the embryo is gradually evolved. These cells grow in many different ways; some elongate into fibers, others remain spherical; "some excrete around them a large amount of intercellular substance and make cartilage, bone, and connective tissue; others make little intercellular substance. In some of them contractility of the original egg-protoplasm is intensified and they become muscle-fibers. Others become so modified in structure that they almost or quite lose the contractile power possessed by the ovum, but developing to a high degree its irritability, or faculty of being easily changed by external influence,



FIGS. 48, 49 AND 50.—Successive stages of Segmentation of the Yolk.

they become nerve-cells or the end-organs of nerve-fibers in the retina and other sense apparatuses. Some cells become distinctly secretory, others excretory; some become horny, and as epidermis, hairs, and nails, serve to protect the organism. The general result is that from a set of similar cells, formed by the division of a single cell, the oösperm, there is developed that heterogeneous mass of groups of cells, each with distinctive modes of growth and with special physiological properties, which constitutes the tissues and organs of the adult human body." The whole process of segmentation is completed in the rabbit within about seventy hours.

Now begins another important change. A clear fluid accumulates in the center of the mass, and gradually increases in quantity, until a greater part of the original cells become flattened and closely crowded to the surface. We then have a vesicle, called the blastodermic vesicle, and the flattened cell wall is known as the blastodermic membrane. It is found now that

by absorption, the dimensions of the ovum have been increased from a diameter of $\frac{1}{5}\frac{1}{0}$ to $\frac{1}{2}\frac{1}{5}$ of an inch.

All the cells formed by the original segmentation do not take part in the formation of the blastodermic membrane. Those which are left accumulate and lie together at one spot just beneath the membrane, where by peripheral extension they gradually spread over and line the inner surface of the blastodermic membrane, thereby providing for it a second, or sub, layer. The outer layer of the blastodermic membrane is accordingly termed the *ectoderm*, and the inner layer the *entoderm*. The zona pellucida is now called the *chorion*, and there is formed between it and the blastodermic membrane a thin film of fluid. During the formation of the entoderm, a bright round spot is observed in the ectoderm, which, as further observation shows, marks the place at which all the more important processes connected with embryonic development take place, and is termed the *area germinativa*. This is formed by an aggregation of the original segmentary cells. It at first presents a homogeneous appearance, but there soon develops in its center a clear space, called the *area pellucida*, bounded by a dense layer of cells. The area pellucida, at first circular, becomes oval, and there forms in its center a dark oval spot, termed the *embryonic* spot. A longitudinal furrow, or shallow groove, which has been termed the *primitive trace*, the borders of which are called the dorsal plates, then makes its appearance in the embryonic spot, constituting the earliest indication of the cerebro-spinal canal.

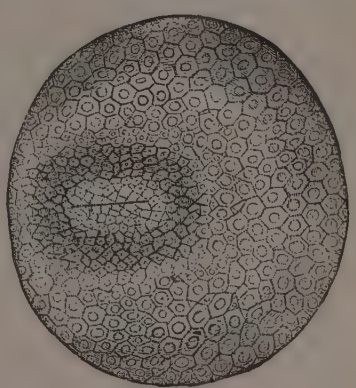


FIG. 51.—External Surface of the Ovum, with *Area Germinativa*.

A third intermediate cell-layer has meanwhile formed, called the mesoderm, lying between the ectoderm and the entoderm. In this layer are developed the primitive blood-vessels, which, as they develop, give to the area germinativa the name of *area vasculosa*. Later the mesoderm divides into two distinct layers, giving to the embryonic structures, at one stage, four distinct layers.

Briefly, it may be said that the ectoderm is concerned in

the formation of the epidermis, hair, nails, the glandular structures of the skin, the brain, the spinal cord, the organs of special sense, and, it is commonly supposed, the genito-urinary system. The outer stratum of the mesoderm gives origin to the corium, the muscles of the trunk concerned in moving the body, and the skeleton. The inner layer of the mesoderm provides the muscular and fibrous tissues of the digestive tract, the blood, the blood-vessels and the blood-glands. The entoderm supplies the epithelium lining the walls and glands of the intestines.

When a transverse section of the primitive trace is placed under a microscope, its characters are readily recognized, while beneath the furrow a cylindrical organ known as the

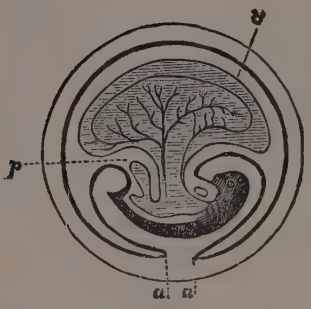


FIG. 52.

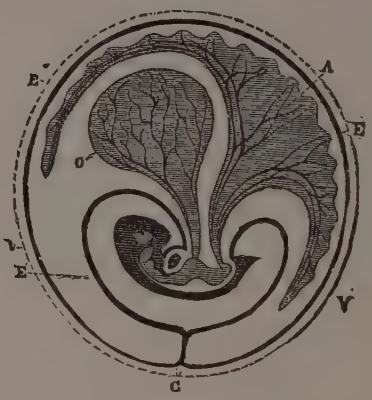


FIG. 53.

chorda dorsalis may be seen. It is about this structure that the vertebræ eventually form. The latter bodies themselves are derived from two longitudinal chords, separated by a cleavage from the portions of the intermediate layer next to the chorda dorsalis on either side. The peripheral portions of the mesoderm then become the lateral or abdominal plates. The dorsal plates continue their development until they meet in the median line, forming a tube known as the *tubus medullaris*, the cavity within which is ultimately elaborated the central nervous system.

The mesoderm, which at this point has been fused into a single layer, now separates into two strata united by their inner borders, and thereby forms what are known as the *mesenteric folds*. The opposite extremities of the inner stratum of the mesoderm curve inwards, and finally unite to form the intestine,

while at the same time they enclose the entoderm. The closure in this case is from front to rear, as well as from side to side, but does not include the entire blastodermic vesicle, a considerable portion of which, called the *umbilical vesicle*, during the early months is connected to the body of the embryo. Finally the ectoderm and the outer stratum of the mesoderm curve forwards and inwards to inclose a long cavity which surrounds the intestines. This cavity is eventually divided by the diaphragm into the thorax and the abdomen.

The embryo as thus far formed gradually moves towards the center of the ovum, while there rises about it, on every side, folds made up of the ectoderm and the outer layer of the mesoderm. Between the latter and the inner stratum is a collection of fluid. The process of depression goes on, and the folds of the ectoderm, now called the amniotic folds, approach closer and closer, until eventually they meet.



FIG. 54.—Showing Amnio-chorial Pocket of False Waters.

The partitions are subsequently broken down, and there is formed a cavity called the *amniotic cavity*, with its outer sac known as the *amnion*. This cavity fills with fluid commonly spoken of as "*the waters*," or *liquor amnii*.

Between the chorion and amnion is often found a gelatinous fluid, traversed by minute filamentous processes, called the *vitriform body*, or *corpus reticule*. It sometimes exists in considerable quantity, and near the end of pregnancy may be discharged by rupture of the decidua and chorion, and thereby give rise to the supposition that the waters (liquor amnii) have escaped.

SOURCES OF NOURISHMENT.—The ovum, during its passage through the Fallopian tube, is increased in size by absorption, from $\frac{1}{125}$ of an inch to from $\frac{1}{50}$ to $\frac{1}{25}$ of an inch. When once lodged within the cavity of the uterus, the ovum begins to draw its nourishment from the mucous membrane lining that organ, at first by mere absorption through its walls, and later through the utero-placental circulation. The structure previously alluded to as the umbilical vesicle, lined by the entoderm, and covered by the inner stratum of the mesoderm, doubtless contributes to embryonic nourishment. Its cavity, which at

first communicates with the intestine, soon becomes separated by obliteration of its passage, but remains attached to the intestine by a pedicle. In order to obtain a clear idea of fœtal nutrition and of preceding embryonic development, it becomes necessary to enter into a more intimate acquaintance with certain structures to which allusion has already been made.

THE CHORION.—The chorion is the external membrane which envelops the ovum. Originally it consists, as elsewhere stated, of the vitelline membrane, or zona pellucida. Soon after the ovum enters the uterus, this part develops amorphous villi which serve to anchor the ovum to the uterine mucous membrane. When once the amnion has been formed by a meeting of the folds of the blastodermic membrane over the back of the embryo, and an absorption of the partitions between them, the outer layer of the blastoderm for a time remains in relation to the existing chorion; but the latter, so far as it is a vestige of the zona pellucida, disappears, and a new chorion, as it were, is formed from the ectoderm. The new chorion in turn becomes covered with a growth of non-vascular villosities, which are not solid but hollow. These villi develop rapidly in size and number, by a process of gemmation, so that at the close of the third week the entire ovum presents upon the outer surface its characteristic shaggy appearance.



FIG. 55.—Human Embryo at the third week, with Villi of the Chorion.

THE ALLANTOIS.—During the third week a new organ is developed, by means of which provision is made for supplying the rapidly increasing nutritive demands of the embryo. This organ, which establishes vascular connection between the embryo and chorion, is termed the allantois. It begins as a sac-like projection from the posterior extremity of the intestine, while yet the umbilical vesicle is an organ of considerable size. It is composed of two layers derived from the entoderm,

and the inner layer of the mesoderm, which soon unite to form one membrane. At first it is provided with two arteries and two veins, but later the vein on the right side becomes obliterated. These are the same vessels which are afterward found in the fully developed umbilical cord. Before the close of the fourth week the allantois reaches the chorion, and then begins to spread upon it and form a vascular lining. The chorion and allantois now become fused into a single membrane, and constitute the permanent chorion, the outer surface of which is called the exochorion, and the inner the endochorion. During the development of the allantois the umbilical vesicle diminishes rapidly in relative size, until at the end of the sixth week it is no larger than a pea.

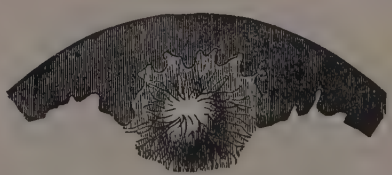


FIG. 56.—Formation of the Decidua Reflexa. (First stage.)

As development of the ovum advances, its surface becomes less and less vascular, except near the place where the allantois originally anchored to the chorion, and there vascularity is rapidly increased. At other places the villi of the chorion also atrophy and disappear, until, after a time, the greater portion of the ovum becomes bare, while the remainder retains its villi in full development. This is the site at which the placenta ultimately forms.

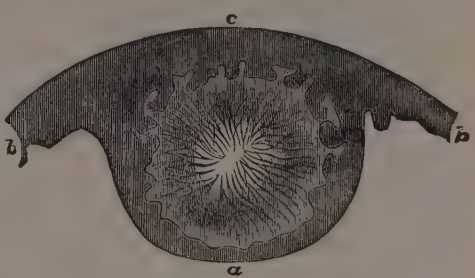


FIG. 57.—Formation of the Decidua Reflexa completed.

THE DECIDUA.—The decidua is composed of three distinct portions, namely, the decidua vera, the decidua reflexa, and the decidua serotina. The decidua vera (or uterine decidua) is nothing more nor less than the altered mucous membrane lining the uterine cavity. The decidua reflexa (ovular or epichorial decidua) is a structure formed from the uterine mucous membrane, which, when completed, closely envelops the ovum. Between these two portions there is at first, over a greater part of the surface, a decided interspace filled with viscid, opaque mucus; but after a certain degree of development has been

attained, the enlarged ovum brings the two surfaces into close contact. The decidua serotina (or placental decidua) is merely that part of the uterine mucous membrane on which the ovum rests, and which, eventually, is covered by the placenta.

When first formed, the decidua vera is a hollow, triangular sac, having three openings into it, being those of the Fallopian tubes and os uteri. It continues to develop, by hypertrophy, up to the third month, and then, owing to pressure, atrophy begins; the blood-vessels disappear, a fatty degeneration sets in, but the structure is not completely altered till gestation ends. The process is continued until it becomes thin and transparent. When fully developed, it presents, under a lens, characters which clearly establish its identity as hypertrophied uterine mucous membrane.

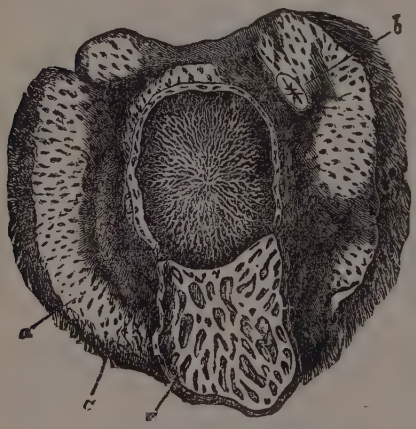


FIG. 58.—Flap of Decidua Reflexa turned down, disclosing Ovum.

The formation of the decidua reflexa is an interesting study. As elsewhere remarked, the ovum, on reaching the uterine cavity, finds the mucous membrane in a hypertrophied and convoluted state, so that the cavity of the organ is well nigh obliterated. It therefore forms easy attachment in a fold near the point of entrance, and the rapidly formed villi of the zona pellucida serve to retain it. The mucous membrane at the base of the ovum begins to sprout about it, and extends, until, after a time, the ovum is completely inclosed. Up to the third month, it should be remembered, the decidua vera and decidua reflexa are not in contact throughout, since this fact has an important bearing on the question of superfœtation. By the close of pregnancy the decidua reflexa, like the decidua vera, becomes greatly altered in appearance, and from a similar cause. It is then very like the decidua vera, with which it blends, and from which careful dissection only is able to separate it.

THE PLACENTA.—The villi of the chorion are sent down into the tissues of the decidua, whence is derived the nutriment so necessary to proper development of the ovum. After the vascular relation between the embryo and permanent

chorion have been formed, the area of nutritive supply is greatly diminished by atrophy of the villi of the chorion over about two-thirds of its surface, and the thinning, as well, of the decidua reflexa, and obliteration of its vessels. *Pari passu* with these changes, the whole process of embryonic supply and waste becomes concentrated at the decidua serotina. The villi of the chorion at this point become arranged in tufts, sixteen to twenty in number, the villi themselves multiply, and a thick, soft, spongy mass results, which constitutes the fœtal portion of the placenta. Within the transparent walls of the villi the contained vessels may be seen under the microscope, distended with blood, and presenting an appearance somewhat resembling that of a loop of small intestine. These capillaries are the terminal ramifications of the umbilical arteries and vein, with terminal loops contained in the digitations of the villi. From the accompanying cut it will be seen that each arterial twig is accompanied by a corresponding venous branch, the two uniting to form the terminal arch or loop.

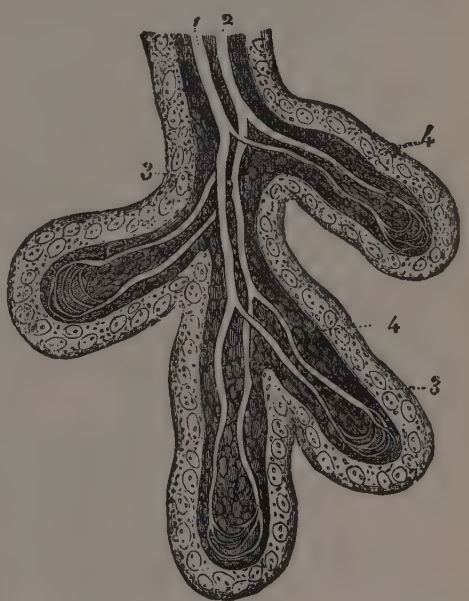


FIG. 59.—Placental Villus, magnified.

By this means the blood of the fœtus is brought very near the blood of the mother, but does not come into actual contact with it. This fact is verified by utter inability to force any fluid into the material circulation by the most carefully conducted injections through the fœtal vessels.

The existence of lymphatics, or nerves, in the placenta, has never been demonstrated.

The spaces between the villi of the placenta, which have been demonstrated to be sinuses in which circulates material blood, extend through the whole thickness of the organ, closely embracing all the ramifications of the fœtal tufts. The essen-

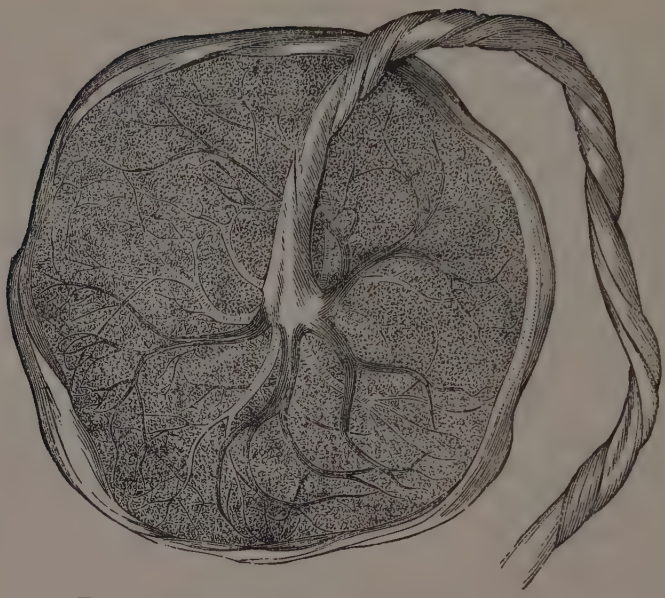


FIG. 60.—Fœtal surface of the Placenta.

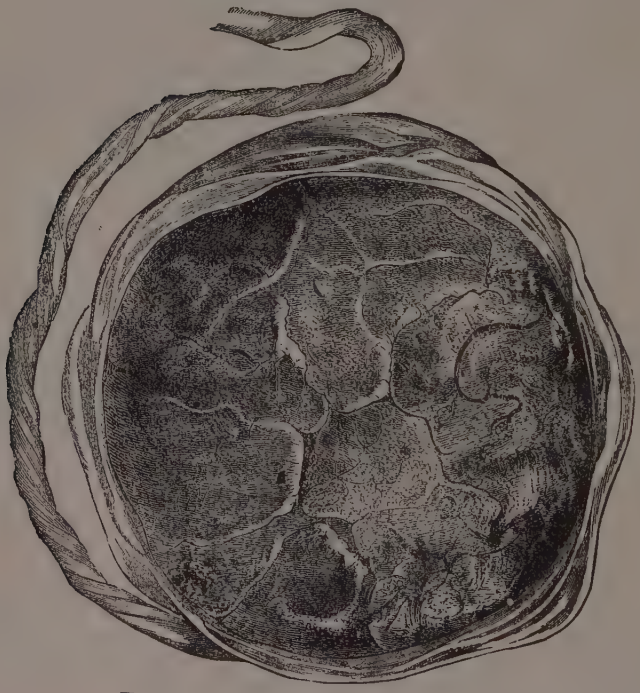
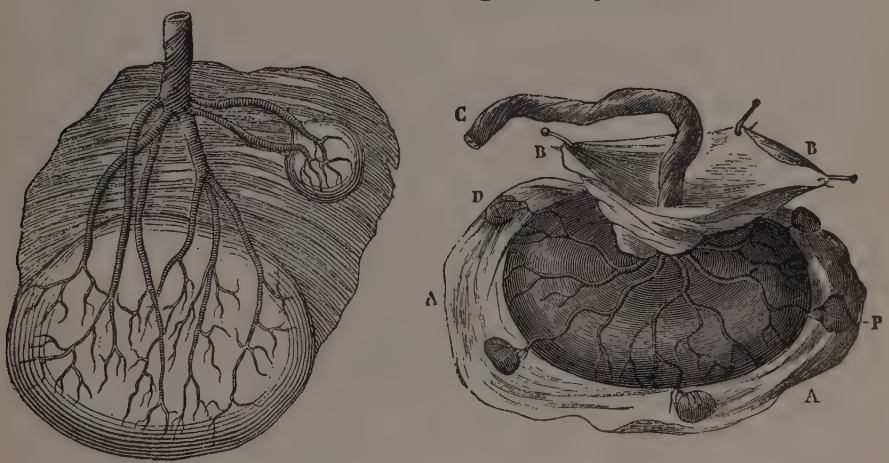


FIG. 61.—Uterine surface of the Placenta.

tial composition of the placenta when fully developed is nothing but blood-vessels. All the tissues which it originally contained have disappeared, save the blood-vessels of the fœtus, associated with and adherent to the larger blood-vessels of the mother.

General Description.—The placenta, upon examination as a whole, is found to be a soft, spongy mass, of nearly circular form. It measures about seven and a half inches in diameter, about an inch in thickness at the insertion of the unbilical cord, and has an average weight of about sixteen ounces. Its fœtal surface is smooth, and, through the amnion which covers it, can be seen the vessels radiating in every direction over the



FIGS. 62 AND 63.—Specimens of Placentæ Succenturiatæ. (Auvard.)

surface of the organ. The uterine face has a roughened, spongy feel, and is divided into a number of lobes, corresponding to the fœtal tufts, or cotyledons, before described. The latter are penetrated by curled arteries from the uterus, which convey the maternal blood into the lacunæ or sinuses between the fœtal tufts. The blood returns to the uterus by the coronary vein on the margin of the placenta, and the sinuses in the septa between the cotyledons.

Functions.—"The placenta," says Dalton, "must accordingly be regarded as an organ which performs, during intra-uterine life, offices similar to those of the lungs and the intestines after birth. It absorbs nourishment, renovates the blood, and discharges by exhalation various excrementitious matters which originate in the process of fœtal nutrition."

Abnormalities of form are often met. The organ is sometimes divided into distinct parts; while, again, similar supplementary placentæ, or placentæ succenturiatæ, may be found around the main mass. When this condition exists, one of the parts is liable to be left behind, exposing the woman to dangers of septic infection and secondary hemorrhage. The umbilical cord, instead of being attached to the center of the organ, may be at the margin, in which case it is termed *battledore placenta*.

The term *insertio valamentosa* is applied when the umbilical

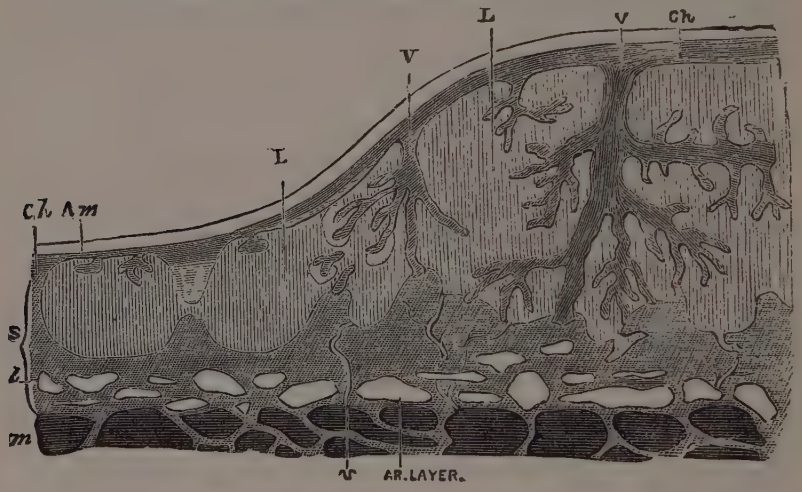


FIG. 64.—Section of Uterus and Placenta in the fifth month. *Ch.* chorion. *Am.* amnion. *V.* villi. *L.* lacunæ. *S.* serotina. *Ar.* areolar. *V.* small arteries. (Leopold.)

vessels extend for some distance along the membranes before reaching the placenta.

Changes Preparatory to Separation.—At about the eighth month the giant cells of the serotina, until this time in contact with the veins, begin to penetrate the vessels, and by their presence constitute foci of coagulation. These, together with a varying amount of fatty and calcareous degeneration, prepare the placenta for easy separation in labor by the contracting uterus.

THE UMBILICAL CORD.—This is formed chiefly by elongation of the pedicle of the allantois, and obliteration of its cavity. Thus constructed it consists of the following parts: the amniotic sheath (which entirely surrounds it, except at

one point, where a small slit gives egress to the pedicle of the shrunken umbilical vesicle); the two umbilical arteries, and one vein; the remains of the pedicle of the umbilical vesicle; the remains of the pedicle of the allantois; and finally the gelatine of Wharton. It is usually about the thickness of the little finger, but varies greatly, its circumference depending mainly on the quantity of Wharton's gelatine. Owing to the greater length of the right artery, the vessels in their spiral course commonly observe the direction from right to left, the vein forming an axis about which the arteries curl. The average length of the cord is twenty-two inches, but it has been observed as short as three inches, and as long as five or six feet. As a rule, it possesses considerable strength, as may be demonstrated by traction made upon it for the purpose of placental removal. Still, in some cases, slight traction will cause it to part. One extremity is firmly attached to the umbilicus, and the other to the placenta. No nerves or lymphatics are said to exist in its structure.

The Liquor Amnii.—The amniotic fluid is supposed to result mainly from the exudation of serum from a fine capillary network of blood-vessels developed just beneath the amnion, in that part of the chorion which covers the placenta. In the latter half of pregnancy this network of vessels disappears. The quantity varies greatly, and diminishes after the fifth month. When in excess of three pints, the condition is one of *hydrops amnii.*

CHAPTER II.

DEVELOPMENT OF THE EMBRYO AND FŒTUS.

An account of the development of the embryo and fœtus belongs properly to physiology, and allusion to it here is designedly brief. The term embryo is properly applied to the product of conception up to the close of the third month of utero-gestation, after which time the term fœtus ought to be substituted. Embryology, save for the light which comparative physiology throws upon it, is, in the human, shrouded in much obscurity. The opportunities afforded for the examina-

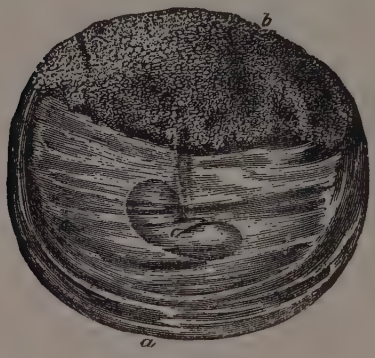


FIG. 65.—Ovum and Embryo.



FIG. 66. — Ovum of seven weeks. (Natural size.)

tion of bodies, dead in the early stages of pregnancy, are very limited, and it is probable that our acquaintance with the subject must continue to be made chiefly through study of the process in animals.

IN THE FIRST MONTH.—The embryo, in the first week of gestation, is a minute gelatinous and semi-transparent mass, of a grayish color, presenting to the unaided eye no definite traces of either head or extremities. The entire ovum measures but one-fourth of an inch, and the embryo one-twelfth; but during the next week they double in dimensions. The amnion becomes fully developed. The allantois reaches the periphery of the ovum, but the vessels do not yet penetrate the villi. At the close of the month the ovum is about the size of a pigeon's egg, and weighs about forty grains. The embryo is about three-fourths of an inch in extreme length, and about one-third of an inch in direct measurement. The structures have

so little bulk that, when ruptured, they easily escape attention, in abortions, generally passing with a coagulum.

SECOND MONTH.—At eight weeks the ovum is about the size of a hen's egg, and the well developed villi of the chorion are still imbedded in the decidua throughout. It weighs from 180 to 300 grains. The embryo is about two-thirds of an inch in length from head to caudal curve; its independent circulatory



FIG. 67.—Ovum at five months.

system is forming; indications of the external generative organs are visible; and ossification has begun in several parts of the body.

THIRD MONTH.—The embryo weighs from 300 to 400 grains, and measures from 2½ to 3½ inches in length. The forearm is well formed and the fingers are discernible. The umbilical cord is about 2½ inches in length. The head is relatively large; the neck separates it from the trunk, and the eyes are prominent.

The chorion has lost most of its villi, and the placenta is formed. Points of ossification are present in most of the bones. Thin membranous nails appear on the fingers and toes. Sex may be determined by presence or absence of a uterus.

FOURTH MONTH.—The fœtus weighs five or six ounces, and is about five inches long. Its sex is more distinct. Movements are visible. The convolutions of the brain are beginning to form; ossification is extending; the placenta is increasing in size, and the cord is about twelve inches long. The head is one-fourth the length of the whole body. The sutures and fontanelles are widely separated. Hair begins to appear on the scalp. If born, the fœtus may live three or four hours.

FIFTH MONTH.—Fœtal weight has increased to ten ounces, and length to about nine inches. The head is still relatively large. Fine hair (lanugo) appears over the whole body. Fœtal movements can be felt by the mother. If born, the fœtus can live but a few hours.

SIXTH MONTH.—Weight about twenty-four ounces; length about eleven inches. Fat is found in the subcutaneous cellular tissue. The testicles are still in the abdominal cavity. The clitoris is prominent. Hair is darker and more abundant. The *membrana pupillaris* exists, but the eyelids separate. If born at this time the fœtus breathes freely, but life is retained only a few hours, with rare exceptions.

SEVENTH MONTH.—Weight from three to four pounds; length fourteen or fifteen inches. The skin is wrinkled, of red color, and covered with vernix caseosa. The testicles have descended into the scrotum. The pupillary membrane disappears. If younger than twenty-eight weeks it is not likely to live.

EIGHTH MONTH.—Weight from four to five pounds; length sixteen to eighteen inches. Development is now rather in thickness than in length. The nails are nearly perfect. The lanugo is disappearing from the face. The navel has gradually approached the center of the body, until now it has nearly reached that median point. The cranial bones are easily moulded under pressure, a point to be remembered, as bearing on the question of induced labor in pelvic deformity.

NINTH MONTH, or *At Term*.—At the end of pregnancy the fœtus weighs an average of six and a half or seven pounds, and measures about twenty inches in length. If we were to take the weights of children as given by mothers and friends, this average would be greatly increased. Out of 3,000 children

delivered under the care of Cazeaux, at different charities, but one reached ten pounds. Of 4,000 children delivered at La Maternité one only weighed twelve pounds. (Lachapelle.) The birth of one has recently been recorded whose weight was twenty-one pounds. Probably the largest fœtus on record was that born in Ohio to Mrs. Captain Bates, the Nova Scotia giantess. Its weight is said to have been nearly twenty-four pounds. Children have been born at maturity, and lived, whose weight was only one pound. The average weight of mature males is greater than that of females.

At birth the fœtus is covered with *vernix caseosa,* a whitish, tenacious substance, composed of a mixture of surface epithelium, down, and the products of the sebaceous glands. During intra-uterine life it serves as a protection for the skin against the amniotic fluid. It can be thoroughly removed only by preceding the use of water with a free inunction.

Circulation of the Blood in the Fœtus.—The following is a brief, but yet explicit, résumé of the fœtal circulation: Blood is conveyed through the umbilical arteries, which are terminations or branches of the iliac arteries, to the placenta, where, within the villi of the chorion, the interchanges with the maternal blood take place. After being thus renovated and recharged with oxygen, it collects within the umbilical vein, from innumerable branches, and passes back through the umbilical cord to the liver. The blood thus returned to the fœtus is arterial, and that which passed through the umbilical arteries, venous; but it is so in a modified sense only. After reaching the liver, on its return from the placenta, a part of it first circulates through the liver, and then passes out through the hepatic veins, while the rest goes through the ductus venosus into the inferior vena cava, and both of these streams, uniting in this vessel, continue on to the right auricle. The two columns of blood, that is, the blood passing into the vena cava from the hepatic vein, and from the ductus, join the stream which has been collected from the lower part of the body, and mix with it. In early fœtal life the inferior vena cava opens at the septum of the auricles into both cavities, though the chief part of the blood enters the left, owing to the increased development of the Eustachian valve. Subsequently this valve becomes smaller, and by the increased development of the valve guarding the foramen ovale, the current is turned more and more into the right auricle. In this cavity the blood is partly

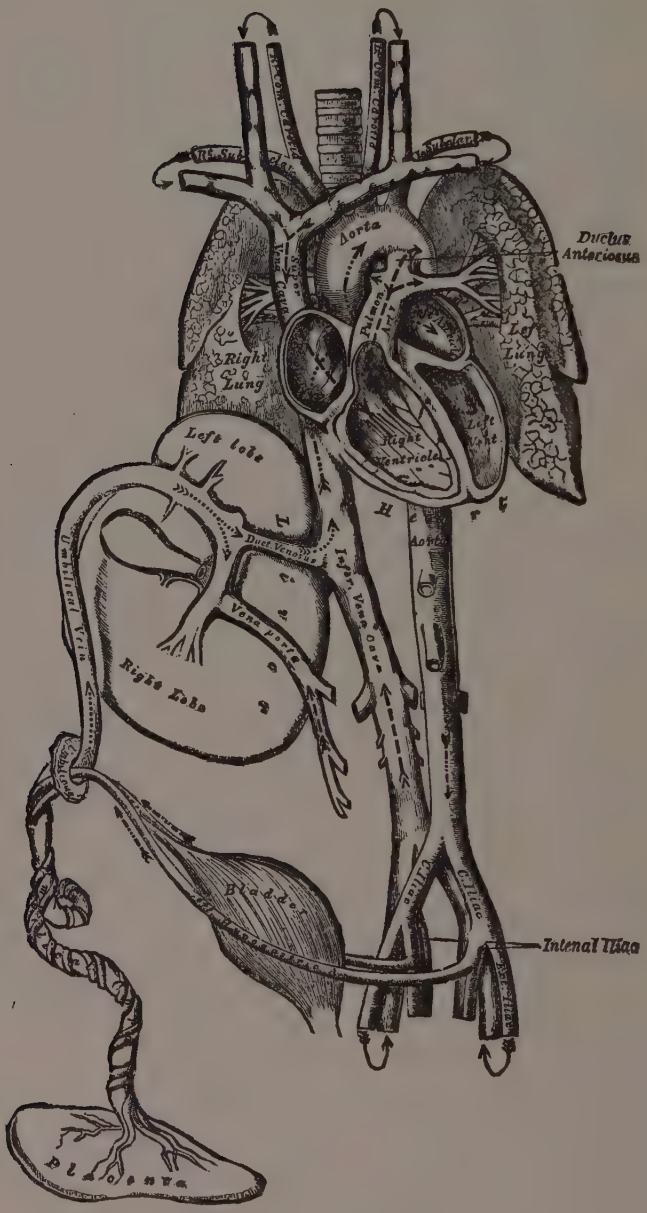


FIG. 68.—Diagram of the Fœtal Circulation.

mixed with that which enters from the superior vena cava, and a part of it descends into the right ventricle, whence it passes, in part, through the pulmonary artery, into the lung tissue. No proper pulmonary circulation having yet been established, only about half the blood contained in the right ventricle enters the pulmonary artery, whilst the other half enters the descending aorta through the ductus arteriosus. The imperfectly developed pulmonary veins convey to the left auricle but a small quantity of blood, the chief supply being received from the right auricle through the foramen ovale, through which passes the main stream from the inferior vena cava. From the left auricle the blood, which is semi-arterial, descends into the left ventricle, and thence into the first division of the aorta. By virtue of this movement the head and upper extremities are supplied, through the carotid and subclavian arteries, with the blood which has been but little deteriorated in quality, and escape the more venous current from the right ventricle through the ductus arteriosus.

At the birth of the fœtus there occurs a profound revolution in the circulation. Air now enters and expands the lungs, and, as a result, blood begins to pass freely into the pulmonary circulation. The blood received into the right ventricle is now forced through the pulmonary system exclusively, the ductus arteriosus at once closing. After passing through the lungs and being oxygenated, the blood flows in greatly increased quantity into the left auricle. It is presumed that in the latter cavity the blood pressure is considerably increased by cessation of the placental circulation, while, through moderation of relative supply, the pressure on the right auricle is diminished, by means of which changes the valve of the foramen ovale is enabled to close. As a result of these modifications, more especially in consequence of closure of the ductus arteriosus, the arterial pressure in the descending aorta is greatly diminished, and were the placenta left unseparated from the child, the long placental circulation could not be maintained. The blood still left in the cord soon coagulates, and circulation therein is effectually arrested. The ductus venosus also contracts on complete establishment of the pulmonary circulation. The foramen ovale sometimes remains open for a short time; but after its closure, owing to the peculiar construction of its valve, and the greater blood pressure in the left auricle, there is no intercommunication between the contents of the two cavities.

THE CRANIUM.—The general anatomy of the fœtal head is of much greater value to the obstetrician or student of midwifery than that of any other part of the body. Apart from its dimensions, the chief anatomical peculiarity of interest is that of the cephalic bones, and more especially of the calvarium. These bones are not firmly ossified at their contiguous margins in the fœtus, but are loosely joined by membrane or cartilage, forming above, by their united margins, sutures, or commissures, and fontanelles. This arrangement permits the bones under forcible pressure to overlap, and the head thus to be moulded to correspond to the size and shape of the channel through which it

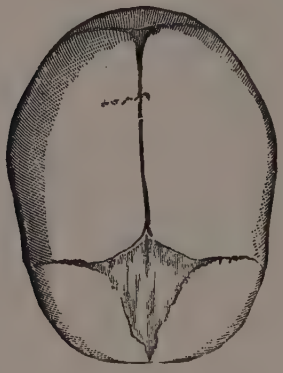


FIG. 69.—The Vertex.

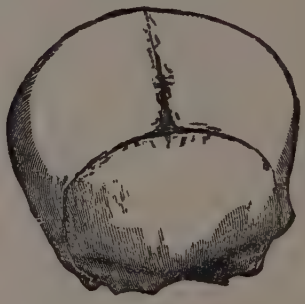


FIG. 70.—Posterior view of the Cranium.

has to pass. Since this change in form of the head affects only the vault of the cranium, the more delicate organs in the base of the brain are protected by unyielding osseous structures.

An acquaintance with the characters of the fœtal cranium is of the greatest service in furnishing the data from which to calculate the position occupied by the part as it presents in labor.

The Sutures and Fontanelles.—The *sagittal suture* extends along the vertex, between the anterior and posterior fontanelles, and is formed by the junction of the two parietal bones. Running forward in the same line, anteriorly from the anterior fontanelle, is a short seam known as the frontal suture. The *coronal suture* is formed by junction of the edges of the two parietal bones and the frontal, and hence extends over the head in a lateral direction, constituting the anterior transverse suture of the vault of the cranium. The *lambdoidal suture* is the line of demarcation between the occipital and

two parietal bones, extending transversely across the head, and forming a figure which resembles the Greek letter Λ, from which its name is derived. In the other commissures of the fœtal cranium we have no special obstetric interest.

Ossification of the cranial bones at birth is incomplete, especially at the margins which are thus approximated, and as the bones have only membranous, or, at the most, cartilaginous, union, moulding of the head through overlapping of the bones under the necessary compression is generally accomplished with facility by the natural efforts, and thereby great mechanical advantage is gained.

The corners, or angles, of the bones, as thus approximated, are obtuse, especially at the junction of the coronal, sagittal and frontal sutures, through deficiency of osseous structure, and hence there are gaps formed anteriorly and posteriorly, which are termed fontanelles. The largest of these is the *anterior fontanelle,* or *bregma,* it being formed by the concurrence of four seams, namely, the sagittal, the frontal, and the two branches of coronal, giving to the opening a lozenge shape. The larger part of the gap is in front of the direct line of the coronal suture, and is sometimes continued some distance into the frontal bone in the line of the frontal suture. The posterior fontanelle is very much smaller, and, in general, is hardly entitled to the designation, since it would be scarcely possible to observe any pulsation there. Its shape is characteristic, and is rendered still more distinct during labor by the depression of the occiput, whereby the limbs of the Λ are made prominent. As will be noticed further on, the occiput, in the greater portion of cases, is turned towards the pubis, and hence the posterior fontanelle is the one more easily felt by the finger in making an examination during labor. Too much emphasis cannot be put on its characteristics, namely, its Λ shape, and the concurrence of only three commissures (the two branches of the lambdoidal and the sagittal). The anterior fontanelle is lozenge-shaped, and has four sutures concurrent, as stated. The angle is much more obtuse; but what most markedly

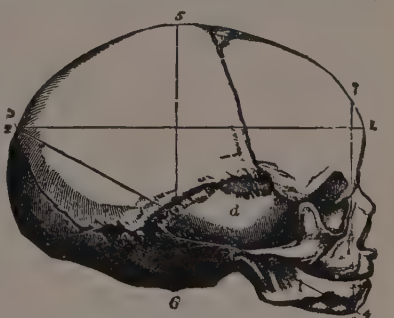


FIG. 71.—Lateral view of Head, with indicated Diameters.

distinguishes it is the existence of the notch, more or less distinct, in the frontal bone. These characters will not at first be readily recognized by the student, but repeated examinations will render them familiar.

Diameters of Fœtal Cranium.—Familiarity with the relative diameters of the fœtal head is essential to an intelligent practice of midwifery. Those of most importance are: 1. The occipito-mental, measurement being taken from the occipital protuberance to the point of the chin, the average giving five and one-half inches. 2. The occipito-frontal, from the occiput to the center of the forehead, on a line with the frontal eminences, four and three-quarters inches. 3. The cervico-bregmatic, one pole being at the foramen magnum, and the other at the posterior margin of the anterior fontanelle, about three and one-half inches. 4. The bi-parietal, the two poles of the diameter being the parietal eminences, three and three-quarters inches. 5. The bi-temporal, being the measurement through the ears, three and one-half inches. 6. The fronto-mental, from the apex of the forehead to the chin, three and one-half inches. 7. The sub-occipito-bregmatic, one pole being say half an inch below the occipital protuberance, and the other at the anterior fontanelle, three and one-half inches. 8. The bi-malar, the poles being at the outer margins of the malar bones, three inches. Others might be added, but those given comprise most of the diameters concerned in the mechanism of labor. Putting these figures in tabular form, they are as follows:

	Inches.
Occipito-mental	5½
Occipito-frontal	4¾
Cervico-bregmatic	3½
Sub-occipito-bregmatic	3½
Bi-parietal	3¾
Bi-temporal	3½
Fronto-mental	3½
Bi-malar	3

Without pausing now to dilate on the change of diameters which is effected by different presentations and positions, it ought to be added that these averages were taken from heads which traversed the parturient canal in occipito-anterior positions of vertex presentations. Dr. Barnes has shown by diagrams made from heads immediately after delivery, that, in difficult and protracted labor, the longer diameters may be in-

creased more than an inch, as the result of lateral compression, by which the bi-parietal diameter is reduced to correspond with the bi-temporal.

Heads of Male and Female Children.—There are some general considerations in relation to the size of the fœtal head which must not be overlooked. On taking the average measurements of a large number of male heads, and comparing them with those of an equal number of female heads, it becomes evident that the former exceed the latter. Sir James Simpson attributed to this fact the increased difficulties and dangers attendant on the birth of male children. This influence he believed to be so marked, that he made a careful estimate of the mothers and children lost in Great Britain during three years, as the result of slightly increased cranial development in males, at about 46,000 infants, and between 3,000 and 4,000 mothers.



FIG. 72.—Attitude of the Fœtus in Utero.

Attitude, Presentation and Position of the Fœtus.—From the earliest period in pregnancy the fœtus in the uterus conforms itself to the shape of the organ in the cavity of which it is placed. Its adaptation to a bent and flexed attitude is clearly disclosed early in embryonic life. While yet it floats freely in the liquor amnii, and is not at all pressed by the uterine walls, the correspondence of the embryonic with the fœtal ovoid is worthy of notice. The flexed attitude becomes more marked as pregnancy advances, and at the close of gestation the fœtus is found with the spinal column bent forwards, the chin on the chest, the arms flexed at the elbows and the forearms laid on the breast. The thighs are bent on the abdomen, the feet extended so as to come in contact with the legs, and the latter, like the forearms, often crossed. This attitude enables the fœtus to occupy the minimum amount of space, and gives to it the form of an ovoid, with the smaller end represented by the head.

PRESENTATIONS AND THEIR CAUSES.—The position of the fœtus with respect to the direction of its long axis, constitutes what is known as *presentation.* When the cephalic pole of the longitudinal diameter is dependent, it is a cephalic presentation. When the knees, feet or breech lie over the os uteri, the pelvic pole of the long diameter presents, and hence it is called a pelvic presentation. Finally, when neither pole of the long diameter is in advance, it is a transverse presentation. In more than nine mature cases out of ten the cephalic extremity forms the presentation. Various theories have been advanced in explanation of the phenomenon, but notwithstanding the attention bestowed on the subject, and the profound research to which it has given rise, the mystery remains only partially solved. It does not answer the claims of science to let the question rest merely on the plea of the suitability or desirability of such conditions for the facile consummation of the reproductive process. Manifestly, there is a cause, the influence of which is felt from an early period in fœtal life, the ultimate effect of which is discovered in the wonderful adaptation of means to ends in the mechanism of labor. Hippocrates appears to have originated the idea that, until the seventh month of gestation, the fœtus occupies a sitting posture, with the vertex turned to the fundus uteri, where it is held by bands from the umbilicus, and that then, as a preparation for expulsion, a complete change of presentation is effected. The smaller percentage of cephalic presentations in miscarriages probably suggested this notion. Aristotle referred the frequency of head presentations to the laws of gravity, which is a theory still tenaciously held by some. To test this gravity doctrine, Dubois experimented by suspending dead fœtuses, of different ages, in a vessel filled with water, and found that not the head, but the back or shoulder, was the part which rested on the bottom. He accordingly denied the influence of gravity, and advanced the theory of instinctive or involuntary fœtal movements to explain the phenomenon in question. Simpson, too, repudiated the theory, and substituted that of reflex fœtal movements. Others have attributed the phenomenon to uterine contractions. Dr. Matthews Duncan has done more than any other recent observer to elucidate the subject. In numerous experiments made by him, in which fœtuses recently dead were allowed to float in a bag filled with salt water, of a specific gravity corresponding closely to that of the liquor amnii, it was

seen that the head lay lower than the breech, and that the right shoulder (from the increased weight of that side due to the situation of the liver) looked downwards. This appeared clearly to demonstrate that the center of gravity lies nearer the cephalic than the pelvic extremity. "The position (presentation) of the fœtus at the full time is," says Dr. Duncan, "in the great mass of cases, fixed and determined about the end of the seventh month of pregnancy. This arises from the fact that about that time the size and shape of the uterus become so nearly and closely adapted to the size and form of the fœtus, that it cannot change the position of its trunk in any material degree. After this time the position of the fœtus must be determined by gravitation, for it is impossible to conceive its reposing in any other.

"All the knowledge we possess of the position (presentation) of the fœtus, after it has entered the second half of pregnancy, leads us to believe that its head lies ordinarily lowest. Before the seventh month it is still capable of having its position in utero changed, by changes merely in the attitude of the mother, and probably it possesses the power of effecting temporary changes, at least, by its own unaided movements. But the fœtus is generally in a state of repose, and not producing motions in its limbs or body. In this state of repose, in a fluid of nearly its own specific gravity, it is impossible to conceive of its maintaining any position but under the influence of gravity. Its position must at all times be mainly, if not entirely, caused and determined by statical circumstances. It is quite conceivable, that while still comparatively free in the uterus, it may, by virtue of its very easy mobility in the dense liquor amnii, change its position. If this occur at a time when its dimensions are beginning to approximate to those of the uterus, having overcome some resistance of the uterine walls by the force of its own muscular efforts, or otherwise—as by accidents to the mother—it may not gravitate back to its old and ordinary position, and thus a preternatural presentation may be produced. The uterine walls are everywhere smooth and glabrous, and rounded; and the fœtus lies in its cavity with its legs, its chief organs of locomotion, elevated, circumstances which appear to render its maintenance of any position but that of gravitation a greater feat than ever was performed by a rope dancer. With all the advantages of its new circumstances, the child after birth cannot assume or maintain a new position:

how much less could it be expected to do so in the uterus, and under circumstances so disadvantageous for the fulfillment of such a function! Those authors who, with Dubois, strive to prove that the position of the fœtus is determined by its own motions have first to prove that it could maintain any position whatever against gravity, without such constant efforts as voluntary muscles are incapable of, and of the actual presence of which no evidence can be furnished."

The law of fœtal accommodation, formulated by Pajot, should be accredited with considerable influence in the determination of presentation. "When one solid body is contained in another," says he, "and if the latter is alternately in a state of motion and of repose, and if the surfaces are rounded and smooth, the included body constantly tends to accommodate its shape and dimensions to the shape and capacity of the containing body."

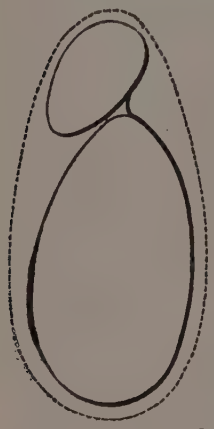


FIG. 73.—The fœtal Ovoid.

Without entering further into a consideration of this question, it may be added that cephalic presentation of the fœtus is not probably referable wholly to any one cause, but a combination of causes, in which gravitation, uterine contractions, and reflex movements, all have an influence.

POSITION.—By this term we design to signify the relation of certain determinate points in the body of the fœtus to the uterine walls. Care must be taken not to confound the two terms —presentation and position. To simplify an understanding of the various positions, we shall regard the dorsal surface of the fœtus as the cardinal feature from the direction of which to designate positions. And still it will be observed, when this subject is treated at length, that positions are often designated by the direction of the occiput in vertex presentation, and the chin in face presentation, as, for example, right occipito-anterior position, left mento-posterior position, and so on. Full consideration of this subject will be taken up in another chapter. Changes of position are frequent in pregnancy, and, we suppose, like presentations take place when not subjected to contrary influences, in a large measure through obedience to the law of gravity. This is not mere speculation, for close observation

has substantiated its truth. When the woman is in the erect posture, the axis of the uterus is presumed to correspond closely with the axis of the plane of the superior strait, and hence forms with the horizon an angle of about thirty degrees. There is generally a little deviation to the right. It is also slightly twisted, so that its left lateral surface looks somewhat forwards. Therefore, when the woman is erect, the anterior uterine wall is not only inclined at the angle mentioned, but the left side drops a little lower than the right.



FIG. 74.—Situation and surroundings of the Fœtus in Utero.

"The deviation of the uterus during pregnancy," says Auvard, "designated by authors generally under the name of lateral obliquity, is not due to a true inclination of the organ during gestation, but to an apparent inclination.

"It is not, in fact, an inclination of the uterus towards the right side or towards the left side, which is the cause of this lateral obliquity, but a want of equality and of parallelism in the development of the two halves of the organ.

"When there is a true inclination, it is secondary to this apparent inclination; it is due to the fact that the uterus is drawn as a whole towards the side most developed."

CHAPTER III.

CHANGES IN THE MATERNAL ORGANISM WROUGHT BY PREGNANCY.

Following closely on the heels of impregnation, changes are begun in the maternal organism, a knowledge of which is essential to an intelligent view of the subject of utero-gestation, and the skillful performance of obstetric duties.

Uterine Changes.—As soon as impregnation takes place Nature sets herself at work to prepare a nidus for the nestling which is about to enter the uterine cavity. The first noticeable change is an increased determination of blood to the uterus, one of the effects being an augmented thickness and rugosity of the mucous lining. As the fecundated ovum enters from the tube it is arrested by one of these folds, and the uterine mucosa rapidly rises and envelops it. This movement is the initial phenomenon looking to the formation of those important structures, elsewhere described, which are to enclose the ovum and ultimately be discharged with it, namely, the deciduæ. The textural changes are both numerous and great. The muscular fibers increase in length and somewhat in breadth, while new elements are also added. Connective tissue is correspondingly developed. The three layers of muscular fibers running in different directions, which cannot be demonstrated in the non-pregnant uterus, become more and more patent. The arteries assume a spiral course and increase both in number and size, while the veins dilate and become wide-meshed reticulated anastomoses. The latter vessels form valveless canals or sinuses of considerable size, which intercommunicate, coursing through the muscular tissues, especially in the vicinity of the placenta. The lymphatics become more numerous and form plexuses in various parts. The nerves are correspondingly developed, and ganglia are found on the inner surface of the organ.

The volume of the uterus is augmented, development being almost wholly confined to the body and fundus. This increase in bulk is due in part to hypertrophy of the walls, but also to distension from development of the ovum. The muscular changes which have been mentioned constitute the most essential elements in the production of augmented weight of the

organ. The walls themselves are not materially altered in thickness. Uterine growth may be said to begin with pregnancy and continue to its close: and yet it can scarcely be regarded as uniformly progressive. At different periods of gestation increase in size seems to be arrested, and then, after brief intervals of rest, development may be unusually active.

Levret's figures give us as the area of the virgin uterus 16 square inches, and that of the pregnant uterus at term 339 square inches. Krause says the uterine cavity is enlarged by pregnancy 519 times. Pajot says if some observers find the uterus at full term measuring 15.7 inches through its greatest diameter, others find it only 12 to 14 inches long, including fundus, body and cervix. Following are his average measurements.

Vertical diameter	14.6
Transverse diameter	10.2
Antero-posterior diameter	9.5

Circumference at the level of the Fallopian tubes 27 to 28 inches.

Cazeaux gives the following as the usual dimensions of the uterus at the principal periods of pregnancy:

	Vertical Diameter, Inches.	Transverse, Inches.	Antero-posterior, Inches.
Third month	2¾	2¾	2¾
Fourth month	3¾	3¾	3¾
Sixth month	8¾	6¼	6¼
Ninth month	12½–14½	9½	8–9¼

Farre has furnished the following table of approximate uterine dimensions for the several calendar months of utero-gestation, which we regard as nearer correct:

	Length, Inches.	Width, Inches.
End of third month	4½–5	4
End of fourth month	5½–6	5
End of fifth month	6–7	5½
End of sixth month	8–9	6½
End of seventh month	10	7½
End of eighth month	11	8
End of ninth month	12	9

As the uterus increases in dimensions, its serous covering is put upon the stretch, and, with advance of pregnancy, the layers of the broad ligament separate, until finally the Fallopian tubes and ovaries lie in contact with the uterus.

In early months, while yet the uterus is a pelvic organ, the

increase is rather in breadth and thickness than in length, as will be seen from Cazeaux's figures, making the organ more spherical than in a non-pregnant state. After it leaves the pelvic cavity, development of the organ is more in a longitudinal direction, until it comes to assume an ovoid shape, with the narrower extremity below, at the cervix and os. In the fifth month, the uterus fills the hypogastrium, and, in the ninth month, its fundus reaches the epigastrium.

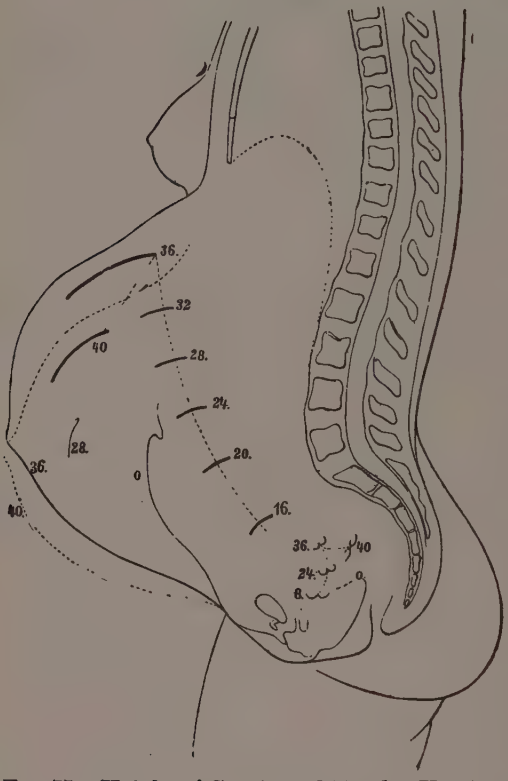


FIG. 75.—Height of Cervix and Fundus Uteri at different weeks of pregnancy. (Schultze.)

CHANGE IN SITUATION.— The first change is in a downward direction, as a result of which, from its close anatomical relations to the bladder, and the connection, in turn, of the bladder to the umbilicus by means of the urachus, there is abdominal flattening and umbilical retraction. It is only after the gravid organ rises, so that its bulk is above the pelvic brim, that abdominal increase is observable. This change in situation, which takes place at the close of the third or beginning of the fourth month, is usually a slow one, and, when completed, enables us to feel the form of the organ in the hypogastrium.

A few days before the advent of labor there is a slight subsidence, or downward movement of the uterus, very marked in some women, but scarcely noticeable in others. This dropping of the fundus is caused chiefly by the extreme relaxation of the soft parts which precedes delivery, to distension of the lower

uterine segment, and to a slight abridgment of the uterine longitudinal diameter.

The Inclination of its Longitudinal Axis.—The fully developed gravid uterus lies mainly within the abdominal cavity, its cervix directed downwards and backwards, and its fundus upwards and forwards. There is also, in general, a slight lateral obliquity, the inclination most frequently being towards the right. Situated thus, its anterior surface rests against the abdominal parietes, its long axis nearly parallel with the axis of the plane of the pelvic brim, thereby forming with the horizon an angle of about thirty degrees. It assumes the vertical line only when the woman is in the semi-recumbent posture. From excessive relaxation of the abdominal parietes, a pendulous condition is sometimes induced.

Changes of Cervical Position.—The situation of the cervix must obviously depend largely upon the situation and inclination of the uterine body. Hence, in the early weeks of pregnancy, the cervix is within easy reach of the finger. After the third month it is higher, and situated so far posteriorly as sometimes to place it almost beyond reach of the index and middle fingers.

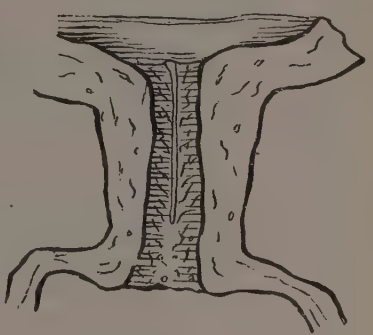


Fig. 76.—Cervix Uteri at close of the Fourth Month.

Changes in the Size and Texture of the Cervix Uteri.—The cervix shares in the hypertrophy of the body and fundus of the uterus, but this change is generally completed by the fourth month. The increase in size is partly from an increased growth and new formation of tissue elements, but more especially from the loosening of its structure and distension of its tissues from serous infiltration. The cervical vessels, under the stimulus of the process going on in the uterine cavity, are dilated, and the result is hyperæmia of the part, and consequent œdema. These conditions in turn occasion a physiological softening of the tissues, first manifested in those parts where there is least resistance, that is, under the mucous membrane on the lips of the os externum, and from this point continued progressively upwards towards the os internum. The cervical follicles are active, and pour out their secretions, though the formation

of a "mucus plug," described by some authors, is questionable. The orifices of these follicles are liable to occlusion, in which case little sacs are formed, known as the ovules of Naboth.

Most of the standard works on midwifery allude to a progressive shortening of the cervix uteri which is supposed to take place in pregnancy. Stoltz, in 1826, questioned the truth of this theory, but, according to Dr. Duncan, he was preceded by Weitbrech in 1750. Various post-mortem examinations by others have clearly shown that, contrary to the older teachings, the cervix does not lose half its length by the sixth month, two-thirds of it by the seventh, and all of it by the middle of the



FIG. 77.—Cervix Uteri at beginning of the Fifth Month.

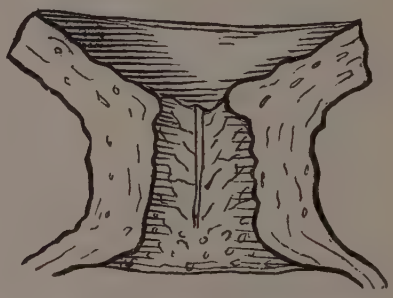


FIG. 78.—Cervix Uteri at close of the Eighth Month.

eighth. To be sure, the part does not present the prominence which it once possessed, but the change is in the direction of softening and elevation, without coincident shortening or obliteration of the cervical canal by expansion of the internal os uteri. We have insisted on the truth of this for years, as the result of careful examinations, and we are convinced that, in the majority of cases, the internal os uteri does not yield till labor supervenes, or is near. According to Dr. Matthews Duncan, the change occurs during the latter half of the ninth month, but, even then, obliteration of the cervical canal appears to be due to the incipient uterine contractions which prepare the cervix for labor. "The length," says Duncan, "of the vaginal portion of the cervix, or the amount

of projection into the vaginal cavity, greatly diminishes as the uterus rises into the cavity of the abdomen."

This is a pretty constant phenomenon of pregnancy, and is probably one of the causes of the mistaken ideas formerly entertained regarding cervical shortening by supposed yielding of the internal os. On making an examination, the vaginal portion of the cervix is found not to be as prominent as usual, and, indeed, in some cases is even scarcely to be felt, and the inference has generally been that the cervical body has been annihilated. The opposite effect is produced by depression of

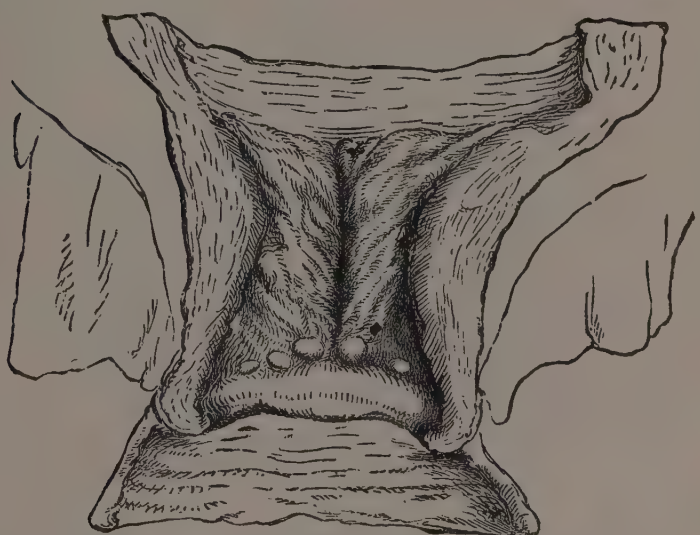


FIG. 79.—Cervix of a Multipara who died in the Eighth Month of Pregnancy. (Duncan.)

the uterus, as in the early weeks of pregnancy. This change led Boivin and Filugelli to regard the cervix as lengthened.

It is probably true, however, that to actual measurement there is a certain amount of cervical shortening, which takes place during pregnancy, growing out of the physiological softening which occurs; but it is not a shortening consequent on relaxation of the internal os, and infringement upon the cervical canal, as has been supposed. We insist that post-mortem, and careful vaginal examinations, have clearly shown that the internal os uteri does not expand until near the close of utero-gestation.

Another factor in the production of apparent shortening is

probably the bulging of the uterine wall anteriorly to the cervix, as an effect of downward pressure of the presenting head. This condition, while common, though by no means uniform, causes the os uteri to be directed backwards towards the sacrum, and gives rise at times, especially in late pregnancy, to considerable difficulty in reaching the part, and at the same time produces a marked shortening of the anterior lip of the os uteri. By pushing the head upwards, or by placing the woman on her knees and elbows, so that the head will recede, the cervix is made to resume its normal situation and feel. This bulging of the lower uterine segment and backward displacement of the os, has, at times, been mistaken for anteflexion of the uterus.



FIG. 80.—Cervix Uteri beyond the Seventh Month.

As pregnancy advances, the os uteri becomes more and more patulous, but the degree of expansion differs in primigravidæ from that in multigravidæ. In the former, after the fourth or fifth month, it gets slightly patulous, but will not receive the end of the finger till a much later period. Even at the eighth, or middle of the ninth, month, the margin of the os is pretty closely contracted. The cavity of the cervix is wide, and if the finger be pushed through the external os, it readily permeates the canal.

In pluriparæ the cervical changes are somewhat influenced by the experiences of former pregnancies and labor. The cervical canal does not assume the spindle shape, but rather resembles a thimble. The os tincæ is more widely expanded, so that at the seventh month the finger easily enters the cervical canal, and approaches the internal os. At the eighth month, the latter, as a rule, has begun slightly to yield, though, in one instance, it may remain closely shut till the close of gestation, and, in another, be so widely expanded as to admit two fingers. Lusk mentions the case of a multipara whom he had occasion to examine towards the end of gestation to determine the

question of safety in making a railroad journey to a neighboring city. He found the cervix soft, the head low, and the internal os dilated to the size of a dollar. Two weeks later, he was called to see her in the early stage of labor, and found that, under the influence of uterine contractions, the canal of the cervix had again closed.

Vaginal and Vulvar Changes.—In the vagina, changes take place corresponding in some regards to those in the uterus. The muscular fibers hypertrophy; the vessels of the venous plexuses increase in size, and impart a blue, or purple color, to

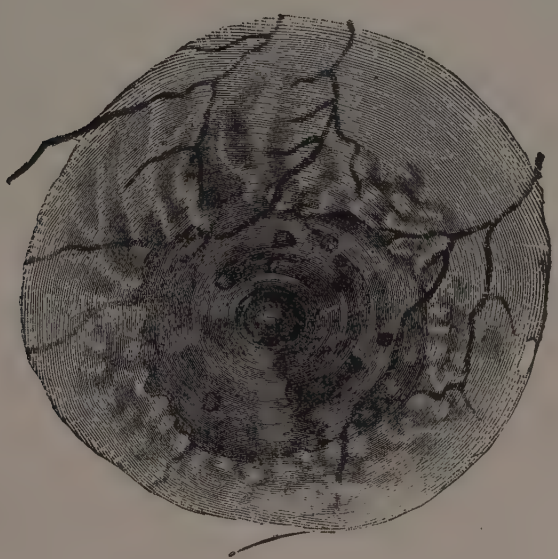


Fig. 81.—Showing the appearance of the Areola.

the vaginal walls. The mucous membrane becomes thickened and amplified, so that though the vaginal tube is drawn upon by ascent of the uterus, the anterior wall of the vagina occasionally protrudes from the vulva.

There is also turgescence of the vulva, pouting of the labia, duskiness of the mucous surfaces, and abundant secretion of the follicles.

Changes in the Mammæ.—Characteristic changes take place in the breasts of such value in the diagnosis of pregnancy as to merit close attention. Tingling and slight sensitiveness are the first indications of change here. These symptoms are soon supplemented by an uncomfortable sense of tension, which

precedes the external evidences of enlargement. Increase in size does not often become noticeable until the fourth month, though from an early period in pregnancy there is a painful sensation of fullness. The veins enlarge and become unusually distinct as they course beneath the skin, and as distension finally becomes excessive, the cutis yields in places, presenting reddish or white lines like those found on the abdomen.

The nipples become turgid, prominent, sensitive, and, on slight stimulation, erect; but the most characteristic changes



FIG. 82.—Lateral view at Sixth Month.



FIG. 83.—Lateral view at Ninth Month.

take place in the areola. Often as early as the second month the surface of this part is soft, œdematous, and slightly elevated. The sebaceous follicles enlarge, and after a time moisten the areola with their secretions. About the middle of pregnancy, discoloration, arising from a deposit of pigment, is noticeable. It is more marked in women of dark complexion, and, from the fact that it is more or less permanent, the sign is of value mainly in primigravidæ. *Colostrum* can usually be expressed from the nipples as early as the tenth or twelfth week.

In the latter months of pregnancy, about the border of the areola is observed a ring presenting a peculiar appearance,

called the secondary areola of Montgomery. The character of it can be better understood from the illustration on page 97 than from any written description. Briefly stated, it looks as though the color had there been discharged by a shower of drops. The appearance is due to the presence of enlarged sebaceous follicles devoid of pigment.

Changes in the Uterine Appendages.—The ovaries enlarge and rise with the broad ligaments; the Fallopian tubes undergo hypertrophy and lose the ciliæ from their epithelium; the folds of the broad ligaments separate and become hypertrophied, and the enlarged round ligaments, owing to greater uterine development posteriorly, are united to the uterus at the junction of the posterior four-fifths with the anterior one-fifth of the lateral uterine surfaces.



FIG. 84.—Pendulous Abdomen.

Abdominal Changes.—As uterine development goes on, the abdominal walls are put upon the stretch, and, in women who are well nourished, are increased in thickness by the abundant formation of adipose tissue. The umbilical appearances are altered from stage to stage. At first, from causes before explained, there is marked retraction of the part. This becomes progressively less, until, at the seventh or eighth month, it begins to assume the exact counterpart of its former appearance, by becoming prominent, owing to the pressure exerted from within. Abdominal distension also gives rise to the formation of reddish streaks, or striæ, which, after delivery, become bleached, so as to resemble cicatrices. They are more abundant upon the sides of the abdomen, where they form sinuous lines, varying in length. They are due to an atrophic condition of the skin-layers, to partial obliteration of the lymph-spaces, and to condensation of the connective tissue elements, which, instead of forming rhomboid meshes, run parallel to one another. They are merely the result of distension, and are not limited to pregnancy.

Relation of the Uterus to Surrounding Parts.—Toward the close of gestation the uterus lies with the anterior surface

directly in contact with the abdominal walls, the intestines having been crowded upwards and backwards until they surround the uterus like an arch. Its lower anterior surface rests upon the posterior surface of the symphysis pubis, and the lower uterine segment dips, to a certain extent, into the pelvic cavity. The posterior uterine wall lies in contact with the spine, by which the fundus is slightly deflected to one side.

Disturbance of Neighboring Organs from Pressure.—The pressure exerted by the gravid uterus creates functional disturbance in the neighboring pelvic organs. Pressure on the bladder, at its cervix and fundus, produces a desire for frequent micturition. The rectum and intestines often become inactive, and the resulting constipation is an annoying complication of the pregnant state. Pressure on the sacral nerves causes pains in the thighs and legs; also cramps and difficult locomotion. Traction on the uterine appendages causes pain in the hypogastric and inguinal regions. Œdema of the lower half of the body, and varicose condition of the veins of the legs, rectum and vulva, arise mainly from pressure, but partly from vascular fullness of the pelvic vessels, induced by pregnancy. In the latter part of pregnancy, pressure on the stomach is annoying. The renal circulation may likewise be impeded.



FIG. 85.—Striæ of Pregnancy. (Winckel.)

Changes in the Blood.—Amongst the most important alterations in the female organism, brought about by the pregnant state, are the changes which occur in the circulating fluid. An attempt has been made to overthrow the common notion that, during pregnancy, the woman is nearly always in a condition analogous to plethora, and to prove the fallacy of referring to this state of the vascular system some of the many ills of which pregnant women complain, such as headache, palpitation, singing in the ears, and shortness of breath; but the attempt has not been altogether successful. With these ideas of pathology, the treatment formerly applied was not illogical when viewed from the standpoint of the dominant school, resort being had to active antiphlogistic medication, low diet, and frequently to

venesection. We are told that it was not uncommon for women to be bled six or eight times during the latter months of gestation, and we have the record of cases wherein such depletion was practiced as a matter of routine every two weeks, and sometimes much oftener. Such treatment is unquestionably wrong.

It appears to have been conclusively demonstrated that there is an increase in the quantity of the circulating fluid, a little in excess of that demanded by the enormous vascular development.

The increase is mainly of serum, but the number of white blood corpuscles, and the quantity of fibrin, are both augmented. On the other hand, there is a decrease in the number of red blood corpuscles, the quantity of albumen and iron of the blood.

For the first six months fibrin diminishes in quantity, and for the remaining three it increases up to the point of hyperinosis.

Following is an extract from tables showing the relative quantities of the before-mentioned constituents:

	Average.	Maximum.	Minimum.
Red globules in pregnancy	111.8	127.1	87.7
Albumen	66.1	68.8	62.4
Fibrin	3.5	4.	2.5
Iron	6.75 gr. in 2½ lbs. dried blood		

	Average.	Maximum.	Minimum.
Red globules in healthy man	141.1	152.	131.
Albumen	69.4	73.	62.
Fibrin	2.2	3.5	1.5
Iron	8.4 gr. in 2½ lbs. dried blood		

Inasmuch as there is an increase in the total quantity of blood, the proper maintenance of the circulation demands an increase either in the frequency of the heart pulsations, or in the quantity of blood forced into the large vessels with each cardiac systole. Observation of pregnant women teaches us that the first requirement is not met: the action of the heart is not accelerated. The compensation, then, is in dilatation of the heart cavi-

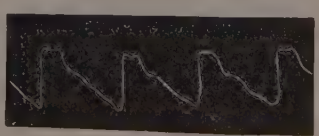


FIG. 86. — Sphygmographic Tracing of the normal Pulse in a Pregnant Woman.

ties and hypertrophy of the left ventricle, the auricles and right ventricle remaining unaffected. As a result of these changes, there is increased arterial tension, which imparts a peculiar fullness and strength to the pulse. According to Durosiez, the heart remains enlarged during lactation, but is rapidly diminished in size in women who do not suckle. In those who have borne many children the organ remains permanently somewhat larger than in nulliparæ.

Miscellaneous Changes.—The nervous system generally becomes more sensitive. There are alterations in the intellectual functions, changes in disposition and character; morbid, capricious appetite, derangement of the senses of taste, smell and sight, and often dizziness, headache, neuralgia and syncope. Melancholia is sometimes met, which, in women predisposed thereto, occasionally ends in mania. The memory is weakened, especially when one pregnancy follows another in rapid succession. On the contrary, the nervous system sometimes becomes calm and strong, and the woman experiences a peculiar sense of well-being.

Respiration is rendered difficult from mechanical causes, especially at a time just previous to the subsidence of the uterus hereinbefore alluded to, owing, as Dohrn has shown, to diminution in the vital capacity of the lungs. The thorax is increased in breadth and diminished in depth, while diaphragmatic action is greatly impeded.

Gastric disturbances are common. Nausea and vomiting, which, from most frequent occurrence in the morning, have been called "morning sickness," are experienced by the majority of women during the early weeks. The author has found, however, upon careful inquiry of women presenting themselves for confinement in Hahnemann hospital, that about forty per cent. of all cases entirely escape the annoying symptom. It generally begins at about the sixth week of pregnancy, and continues for from six days to six or seven weeks. In other cases it forms a complication of later gestation. The appetite is capricious, the longings being in some cases for even disgusting articles of food. Increased flow of saliva is often an accompaniment. The bowels are sometimes loose, but constipation is more common.

In view of the tumult of incipient changes going on, we cannot wonder that the health of women is somewhat impaired during the first three months of pregnancy. After that time,

however, there is generally an improvement. The appetite returns, digestion becomes more active, and assimilation recruits the strength, and increases the weight. Gassner estimates the total increase at about one-thirteenth the entire weight of the body.

Besides the pigmentation of the areola about the nipple, there is discoloration of the linea alba of the abdomen, and at times maculæ appear on different parts of the body, particularly the face, but, as a rule, they disappear after delivery.

Certain changes in the urine have, by some, been considered pathognomonic of pregnancy. These consist in the formation of a deposit when the urine is allowed to stand for a considerable time, which has been called *kiesteïn*. It is observed after the second month of pregnancy, and up to the seventh or eighth. From the fact that a precisely similar substance is sometimes found in the urine of women who are not pregnant, especially if anæmic, and even in the urine of men, it cannot be regarded as a change peculiar to gestation.

The Permanent Changes.—The uterus after delivery does not resume its nulliparous shape and size, but retains vestiges of the condition through which it has passed. The weight of the organ is increased to about an ounce and a half; the fundus and body are rounded externally; the cavity of the body loses its triangular shape, and becomes much larger relatively to the cervix, while the os internum is left somewhat agape. The mucous folds of the cervix are in great measure obliterated, or, at least, are rendered indistinct, and the os internum is patent. Abdominal distension leaves indelible marks in the shape of the striæ mentioned, which, from a reddish or brown color, become silvery-white like cicatrices. The pigmentation of the linea alba is never wholly removed. The breasts give evidence of former pregnancy in the existence of the silvery lines alluded to, and the discoloration of the areola, which has, in a measure, remained. In addition to these changes there are doubtless many which mark a difference between women who have borne children, and those who have not, but further evidence is in the main, referable to parturient effects.

CHAPTER IV.

THE DIAGNOSIS OF PREGNANCY.

Owing to the obscurity and indeterminate character of early symptoms, and the weighty contingencies which hang upon the expressed conviction derived from examination, the diagnosis of pregnancy is one of the most trying duties which the physician is called to perform. It is further intensified by the notion, so prevalent among people, that the signs of pregnancy, from the first, are, or should be, to the trained and skillful observer, clearly legible.

In most cases wherein this interesting condition is suspected to exist, the woman is within marital bonds, and diagnosis is sought more from the promptings of curiosity than any other consideration. Such women, as a rule, are easily pacified with an equivocal answer. In other cases there is an entirely different posture of affairs, and diagnosis is requested, not out of idle curiosity, or to satisfy a momentary whim, but from the pressure of dire forebodings. The woman is not under the safe protection of marriage vows, and, urged on by her fast augmenting fears, or stimulated by an impugning conscience, she seeks positive knowledge. Again: the physician is consulted, not by the woman herself, but by her friends. Parents, perhaps, with or without heart-sickening suspicions of their daughter's unchastity, desire an explanation of the objective and subjective symptoms which have come to their knowledge. In many such cases, so much depends upon the diagnosis rendered, that an error will not be pardoned. The symptoms may be ambiguous, and a most careful investigation may not elicit conclusive evidence, but, by the conviction expressed, the physician has generally to abide. No plea of having done as well as circumstances allowed, will atone for a mistaken opinion. A confession of error will not bind up a broken heart nor restore the lustre to a tarnished reputation. Furthermore, the physician is sometimes called upon for an opinion in cases under litigation, wherein alleged gravidity is an important factor, and final adjudication in fixing responsibility, or in directing the inheritance of property, will be determined largely by the character of his expert testimony.

Classification of the Signs.—The signs of pregnancy should always be classified as *relative* or *presumptive*, and *positive* or *demonstrable* signs. Upon one, or upon a number of the former, nothing more substantial, affirmatively, than probabilities, of various degrees of strength, can be predicated. An unequivocal affirmative diagnosis ought never to be given. The presumptive evidence may be so strong in certain instances as to leave few and feeble possibilities of error, and yet experience teaches the fallacy of drawing absolute conclusions from such data. There are four signs which may be regarded as positive, namely, fœtal movements, ballottement, the sounds of the fœtal heart and recurrent uterine contractions. By some teachers, however, the third alone is looked upon as unconditionally positive, and this is what we formerly taught.

Subjective Symptoms.—In the diagnosis of pregnancy, subjective symptoms should receive due consideration, but objective symptoms must constitute our main reliance. Women are too prone to draw their conclusions from intuitions and mental impressions, and as a result we sometimes have graviditas nervosa, disconnected, perhaps, with even the most common and essential physical indications of pregnancy.

History of the Case.—Items of importance may be gathered from a recital of the history of the case, which should include an account of the mode of development, and the order in which the various observable and sensible signs were manifested.

The Menstrual Flow ought to be carefully inquired after. There may have been a regular return of it throughout the supposed pregnancy; or there may have been complete suppression. Should the former condition prevail, it will justly arouse suspicion. In that case, ascertain wherein the catamenia deviate from a normal standard. If menstruation has ceased, learn the circumstances under which it disappeared, and the peculiarities, if any, which characterized the last two or three "periods."

Pregnancy in Women who Do Not Menstruate.—Cases are on record wherein young women have conceived before the menstrual function had been established; while again, during lactation and suspension of menstruation, impregnation often occurs.

Menstruation During Pregnancy.—It is not very uncommon for a woman to menstruate once, twice or thrice after impreg-

nation, and cases are recorded wherein the catamenia returned with regularity throughout the full term.

Durosiez observed that menstruation is more likely to persist in women affected with mitral stenosis. The flow in these anomalous cases differs from the normal in either quantity or quality, and is not often regular in its appearance. The source of the blood is probably the cervical canal, though in the early weeks it may come from the uterine cavity.

"MORNING SICKNESS"—a sign of some value—is largely subjective, and concerning it strict inquiry should be made. When was it first felt? At what times, and under what circumstances, was it most troublesome? How long did it last?

When *quickening* is alleged to have taken place, try to fix the date, and the precise sensations experienced.

Unreliability of Subjective Symptoms.—With regard to information thus elicited from women, it should be observed that, while it affords valuable data to be used in constructing a diagnosis, it is liable to be wholly fallacious. The menstrual function may or may not be suppressed, and she may or may not have experienced morning sickness and fœtal quickening. Facts are extremely liable to be misconstrued or misrepresented through either the woman's untruthfulness or mistaken convictions.

Objective Symptoms.—For our diagnosis we must depend, then, almost wholly on objective symptoms. The same common means of investigation are available here as in other cases where physical examination is required. They are, inspection, palpation (including "the touch"), percussion, and auscultation, the relative value of which, and the methods of most effective use, will be briefly considered.

INSPECTION.—Inspection will aid very materially, in perplexing cases, in carrying the inquirer to a correct conclusion. The abdominal contour of a woman who has reached the fifth month of gestation is quite diagnostic, even when purposely obscured to a certain degree by the apparel. The experienced observer is often able, by inspection of it, to differentiate between pregnancy and simulating conditions. The precise outline of the gravid abdomen varies, but within limits which make all cases quite similar. As we take a lateral view of a pregnant woman, the abdominal enlargement is seen not to be equable, but its point of greatest projection is near its superior boundary. This peculiarity becomes more and more characteristic as pregnancy

advances. The cause of this is obvious when we recollect the form of the uterus, and the direction of its long axis, which is at an angle of about 60 degrees with the horizon.

This lateral view is of considerable value in the diagnosis of pregnancy. Mere circumferential measurements are of comparatively little importance.

A front view also of the abdominal tumor, taken when the woman is either standing or lying, reveals diagnostic characters, more marked in the erect posture. First should be observed the absence of prominences and irregularities. It is not uncommon to find a difference between the two sides in point of fullness, but the elevation is not confined to a circumscribed area. This is generally due to presence of the fœtal trunk, as the writer has repeatedly demonstrated. Then, too, the tumor arising from pregnancy is narrower, and more prominent along the middle line, than is a pathological enlargement.

Special abdominal appearances, aside from enlargement, should be remembered. During the first few weeks of utero-gestation, the abdomen, instead of being more prominent, is really retracted or flattened, and especially in the umbilical region. This phenomenon has already been explained, but we repeat: The uterus, from its uncommon weight, proceeding in part from actual increase in size, but largely from vascular enlargement, sinks in the pelvic cavity to an unnatural level, and in doing so drags upon the bladder, which, in turn, through the urachus, causes the retraction mentioned.

Along a narrow line, extending from the umbilicus to the pubis, there is darkening, the shades varying from light brown to black.

Fœtal movements are often discernible. They are sometimes closely simulated by spasmodic muscular action, when, as a means of differentiation, palpation affords positive aid.

Inspection of the breasts is a valuable means of diagnosis, by means of which the changes described in the preceding chapter will be observed. The appearance known as the "secondary areola of Montgomery" should receive special attention.

The purplish hue in the vaginal mucous membrane must be seen to be known, but, when once familiar to the eye, will afford considerable aid.

The foregoing embraces an allusion to the principal applications of this means of investigation. When intelligently employed, it furnishes valuable help to unravel perplexing cases.

PALPATION.—If deprived of every sense but the tactile, the physician would still retain the means for making a satisfactory diagnosis in nearly all cases of suspected pregnancy. This mode of examination is in common use, and is highly regarded, yet there are many, even among those long in practice, who, from lack of adequate comprehension of its possibilities, do not value it as highly as they ought. Abdominal palpation alone is sufficient, in many ambiguous cases, effectually to dispel doubt. In early pregnancies it is not capable of such achievements, but when combined with the vaginal touch it becomes a most valuable aid. Later, however, the uterus, with its developing fœtus, rises within easy reach of the hand, and admits of minute examination. The fundus uteri is always easily distinguishable and its height can be clearly determined.

The uterine form, with broad, even front and lateral superfices, is highly characteristic. If the examination be prolonged, the recurrent uterine contractions which are going on throughout the greater part of pregnancy will be felt under the hand; and, during their prevalence, a pretty good outline of the gravid uterus can be distinguished. At the moment of contraction, the surface of the uterus which comes under examination, when not defaced by fibrous growths, conveys to the hand a smooth, regular feel.

In the intervals between contractions, when there is no muscular resistance, it is possible, after the middle of pregnancy, to feel the fœtal form through the uterine walls. At this period, and later, in many cases there is so great a relative redundancy of liquor amnii as to admit of remarkable fœtal mobility. The head, if not presenting closely at the brim, as at this season it frequently is not, may easily be moved from one side of the abdomen to the other. In a modified degree this is also true of the extremities and trunk. The fœtal movements, whether spontaneous or elicited, are felt by the palpating hand. If the abdominal walls are not too thick, palpation is thus capable of affording highly satisfactory evidence upon which to base diagnosis.

If pregnancy be absent, then by deep pressure the abdominal walls in the hypogastric region can be depressed until the fingers touch the spine, in which case the physician may rest assured that there is no pregnancy which has advanced beyond the third or fourth month. If in making such an attempt, resistance is at once encountered, thorough exploration by deep

abdominal pressure and vaginal indigitation should be made to ascertain the nature of it.

"The touch" is a highly efficacious mode of examination, and one which, in cases at all doubtful, ought never to be neglected. By means of it several important signs may be elicited. In the early weeks, the uterus, as before observed, lies lower in the pelvic cavity than during a non-pregnant state. This condition of itself would be of no significance, and, at best, is but a feeble relative sign. After the third month, the uterus having

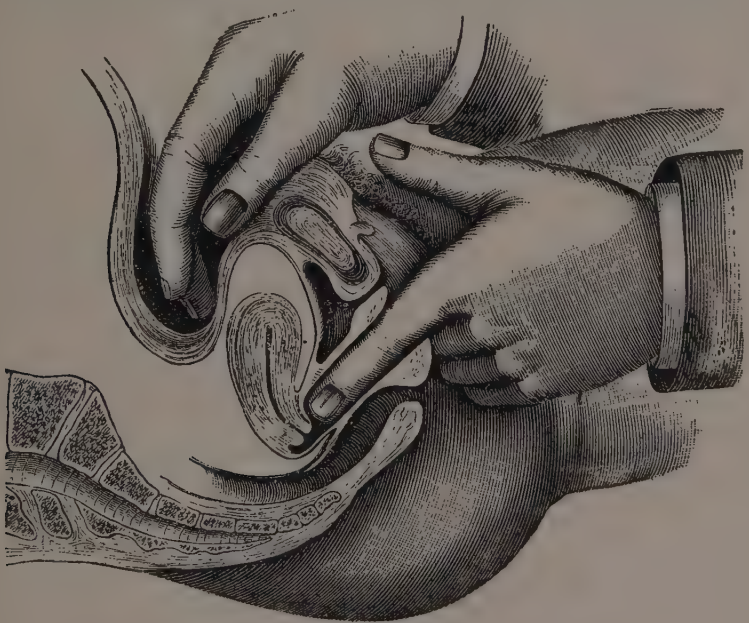


Fig. 87.—Bimanual Examination in the Diagnosis of Pregnancy. (Martin.)

risen so that its bulk lies above the pelvic brim, the cervix is elevated and turned backwards towards the rectum, thereby putting the roof of the anterior vaginal cul-de-sac on the stretch. This is a valuable relative sign when found as a concomitant of other presumptive symptoms.

A few years ago Hegar described a sign of pregnancy, of service in the early weeks, which bids fair to become generally recognized as positive. It is of special value inasmuch as hitherto we have had nothing but relative signs upon which to base diagnosis until near the middle of gestation.

In the early weeks, development of the uterus is confined pretty closely to the body and fundus, and expansion is

greater anteriorly and posteriorly than laterally. At the same time while softening is just beginning in the lower part of the vaginal cervix, it is proceeding more rapidly in the supra-cervical uterine walls, so that there is soon a zone of uterine tissue at the uterine isthmus, which, to the touch, is softer and more boggy than the structures above and below. Then, too, as a result of these changes, it is found that the uterine wall there becomes more prominent, so that the cervix feels as though it were set on the inferior surface of a small sphere. This gives us, as among the first changes in form, that which causes the uterus to lose its pear shape, and the body of the organ to become more spherical.

These changes can best be recognized through recto-abdominal, or recto-vaginal touch, while the uterus is depressed in the pelvis by means of abdominal pressure.

The sign is available as early as the fifth week of pregnancy.

The marked changes in the cervix uteri which begin soon after impregnation and gradually progress to full consummation, have elsewhere been described. At the close of the sixth or seventh week the lips of the os uteri communicate to the examining finger a slight sensation of softness, at that time due, perhaps, in the main, to turgescence and tumefaction of the part, but doubtless attributable in a measure to physiological softening of the uterine neck, dependent on other causes. The process begins at the lowermost part and progressively ascends. An examination made at the sixth month discloses softness to the extent of half its length, but not until near the close of gestation is the reduction complete. The gradually increasing expansion and dilatability of the os uteri which accompanies cervical softening, ought to be kept in mind during examination.

The period at which the internal os uteri gives way, so that the cervical canal becomes part of the uterine cavity, admits of some diversity of opinion. It is the author's conviction (elsewhere expressed), based upon special observation of many cases, that it is not brought about until, or very near, the beginning of labor, and frequently not until pains have been for some time present.

Allusion has been made to the diagnostic value of conjoint examination, i. e., abdominal palpation employed in connection with the vaginal touch. By such manipulation it is possi-

ble to form an approximate estimate of the size of the uterus, and hence the probability or improbability of pregnancy. It should be indulged with due caution, as harshness is liable to produce most unwelcome results.

There is a form of vaginal, or bimanual examination, the employment of which, at certain stages, will disclose a sign of pregnancy by us regarded as positive, namely, *ballottement*. It can be practiced by both hands upon the abdomen. To do so the woman must be placed on her side, one of the operator's hands resting above, and the other below the abdomen as she lies. By a sudden movement of the hand beneath the fœtus, the latter may be displaced or tossed, and the impulse of its return communicated to the keen sense of the operator.

Vaginal *ballottement* is performed by placing the woman on her back in a semi-recumbent posture, and then, with two fingers in the vagina, the uterine wall just anteriorly to the cervix is given a sudden push in the direction of the long uterine axis. This propels the fœtus away from the lower uterine segment, but it soon sinks again in the liquor amnii, and the gentle tap of its contact with the uterine tissues may be felt. When clearly elicited, it is regarded as a positive sign of pregnancy, but it requires skill and experience successfully to practice the manœuvre. It cannot be employed with satisfaction earlier than about the close of the fourth month, nor later than the seventh.

Uterine fluctuation may sometimes be felt, according to Dr. Rosch, by conjoint manipulation—the hand on the abdomen, and two fingers in the vagina; but the delicacy of the sign renders it unreliable for general use. It is recommended as a means of early diagnosis.

Percussion.—This means of diagnosis fills but a small niche. The abdomen, in real gravidity, gives, on percussion over the uterus, sounds, mostly flat, always dull. Should resonance be obtained at the site of the enlargement, it may justly be regarded as almost conclusive evidence of non-pregnancy. It can be employed to confirm other indications, but as a means of positive diagnosis, it possesses no merit.

Auscultation.—When Mayor, of Geneva, tentatively applied his ear to the abdomen of a pregnant woman, in the hope that he might hear fœtal movements, and discovered the inaudibility of these, but heard the unmistakably clear sounds of the fœtal heart, he brought within command a means of diagnosis at

once easy of application and unequivocal in indication. The fœtal heart-beat is *the* positive sign of pregnancy.

The sounds have been compared to those of a watch under a pillow, but an infinitely better idea of them may be obtained by listening to the heart of a new-born child. They were first heard by Mayor with the unaided ear, but we ought not to infer from this that immediate auscultation is preferable. The author has repeatedly demonstrated the superiority of the mediate mode. The double stethoscope gives best satisfaction. The instrument may be applied by firm or by light pressure, the latter being preferable. To properly do this it should be placed on the abdomen in such a way that it will rest evenly and lightly, and then the fingers entirely removed. Sounds can thus be heard which would otherwise be absolutely inaudible. This method of using the stethoscope requires considerable practice to obtain the best results.

The area of audibility depends mainly on the position and presentation of the fœtus. The sounds are conveyed to the ear with the greatest facility by solid tissues or substances; hence they are most distinct when the trunk of the fœtus, at a point near the heart, comes in contact with the uterine walls, and the uterine walls are in turn brought firmly against the abdominal parietes. A dorso-anterior position of the fœtus is most favorable for transmitting the impulse. The area of audibility varies considerably in extent. In one case the sounds can be heard over nearly the whole abdomen, while in another they are circumscribed to a small space. When audible over an extensive area, there is always a point where the *summum of intensity* is reached. Since the left dorso-anterior position of vertex presentation is most frequent, the sounds of the fœtal heart are oftener heard on the left side below the umbilicus. When the child is in the fourth position, the sounds are also on the left side. In second and third positions they are on the right side. In cephalic presentation the area of audibility is lower than in pelvic presentation.

The rapidity of pulsation varies greatly, the average being about 135 beats per minute.

There is want of unanimity among observers regarding the period in pregnancy at which the fœtal heart is first audible. Practice will enable one listener to detect it at an earlier stage than another of less experience. De Paul says that he has heard it at the eleventh week. Naegle could not distinguish

it before the eighteenth week, and his experience in this regard corresponds to that of the average skilled practitioner.

What was formerly termed the "placental souffle," and regarded as a certain sign of pregnancy, is now more appropriately known as the uterine, or abdominal, souffle. This bruit, instead of proceeding from the utero-placental circulation, and marking the placental site, is probably occasioned by the uterine and abdominal circulation, the vessels of which in places are subject to pressure, and accordingly emit a blowing or purring sound. Large abdominal tumors, disconnected with pregnancy, also give rise to the same, or a similar, bruit. It may be modified, or entirely arrested, by the pressure of the stethoscope. As an indication of pregnancy, it doubtless possesses some value, but it must not be admitted as a certain sign, and under no circumstances is it to be regarded as proof of fœtal life.

It is now well understood that, by auscultation of the abdomen of a pregnant woman advanced beyond the fourth month, we may hear the pulsations of the fœtal heart, the *bruit de souffle*, and occasionally fœtal movements and the funic souffle. The first named is a positive sign of pregnancy; the second is of little value save when it is certain that the woman has no other disease which can possibly give rise to it; while the third and fourth are, on one hand, so rarely audible, and, on the other, so ambiguous as to be of little real worth.

The summary of the signs of pregnancy, which appears on page 114, may prove serviceable.

Differential Diagnosis.—The subject of the diagnosis of pregnancy would be far from complete without a few observations on differential diagnosis.

It would be impossible to mention, in a short chapter, all those various conditions which are liable to be mistaken for pregnancy.

When there is an enlarged abdomen which raises a suspicion of pregnancy, combined internal and external examination is highly important. Upon employing it, a tumor of some sort may be discovered, but, if extra-uterine, by careful manipulation of the cervix the uterus can generally be made out as a distinct and free organ, with walls which are not greatly distended. To pass the uterine sound is rarely necessary, except to render assurance doubly sure. If serious doubts are felt, it

Period in Pregnancy.	Subjective and semi-Subjective Signs.	Objective Signs.				Diagnosis.
		Inspection.	Palpation.	Percussion.	Auscultation.	
First Three Months.	Generally menstrual suppression. Commonly nausea and vomiting, beginning after fifth or sixth week. Other derangements of digestive functions. Mammary tingling and discomfort Certain indescribable mental impressions, repeated in successive pregnancies.	Retraction of umbilicus, and abdominal flattening. Salivation.	Prolapsus uteri. Increased size of uterus, determined by conjoint manipulation. Slight cervical softening. Hegar's sign as early as fifth week.	Percussion sounds normal.	The fœtal heart was heard by De-Paul at the eleventh week.	*Presumptive* only. Sometimes only a remove from positive.
Fourth Month.	Same as first three months, excepting nausea and vomiting, which are not always present Sometimes quickening.	Slight abdominal fullness Darkened areola, turgid nipples, and prominent follicles. Occasionally maculæ in various parts. Darkened vaginal mucous membrane.	*Ballottement.* Fundus uteri dimly felt in hypogastrium. Stretching of the roof of the anterior vaginal cul-de-sac. Cervix uteri further softened, os high and directed towards sacrum.	Percussion sounds flat in hypogastrium, tympanitic elsewhere.	Sounds of the fœtal heart are often heard. Uterine *bruit.*	*Generally presumptive;* sometimes positive on the strength of *ballottement* and the fœtal heart sounds.
Fifth Month.	Same as fourth month with the addition of quickening.	Marked abdominal enlargement. Darkened areola, turgid nipples and follicles, mammary secretion, secondary areola and darkening in other parts. Darkened vaginal mucous membrane.	Recurring uterine contractions. Fundus uteri nearly to umbilicus. Fœtal body felt and moved. Fœtal movements felt. Stretching of roof of anterior vaginal cul-de-sac. Cervix soft, in lower segment, situated high and far backwards. *Ballottement.*	Flatness extending.	Do.	*Positive* diagnosis, based on fœtal movements, *ballottement* and the sounds of the fœtal heart.
Sixth Month.	Same as fifth.	Same as fifth with the addition of fœtal movements.	Same as fifth. Fundus uteri as high as the umbilicus.	Flatness extending.	Same as fifth.	*Positive* diagnosis, based on fœtal movements and heart sounds.
Seventh Month.	Same as sixth.	Same as sixth.	Same as sixth, except that *ballottement* is practiced with difficulty. Fundus uteri 3 fingers breadth above umbilicus.	Flatness extending.	Same as sixth.	Same as sixth.
Eighth Month.	Same as seventh.	Same as seventh.	Fundus uteri reaches epigastric region. *Ballottement* impossible, otherwise same as seventh.	Flatness has almost reached its limit of extension.	Same as seventh.	Same as seventh.
Ninth Month.	Same as eighth.	Same as eighth.	Fundus uteri towards close of month subsides somewhat. *Ballottement* impracticable.	Limit of flatness reached.	Same as eighth.	Same as eighth.

would be an unjustifiable act. The feel of the lower uterine segment, in connection with other signs, is diagnostic. From the second to the fourth month the gravid uterus is peculiarly soft, while if tumors are present it is harder. In hæmatometra it is firm, but elastic, and may even give slight fluctuation. In chronic inflammation, the uterus is sometimes rather soft, but usually it is much harder than in pregnancy. Then, too, if inflammation exists, other symtoms, such as tenderness and pain, will strengthen diagnosis. Diagnosis in some cases may still be uncertain at the first examination, but the lapse of a few weeks will clear up the doubtful points. Should the fibroids form knobby projections, as they most frequently do, abdominal palpation would contribute the requisite certainty to the differentiation.

An exact diagnosis of pregnancy is often impossible even at the third month, but again it may be made with a reasonable degree of certainty. If the organ is found slightly anteflexed, and corresponding in size to the probable period of gestation, not painful to manipulation, of a peculiar softness, and, moreover, the woman healthy, though her menses have not appeared during the time, then, every probability points to the one conclusion. The experienced, however, usually act a wise part by making their diagnosis with a distinct reservation.

At a subsequent period, differentiation of the physical condition becomes less difficult, quickening, ballottement and the fœtal heart-sounds clearing away all doubt. But at the fourth or fifth month, though the absolute signs of pregnancy are absent, as in the instance of dead ovum, or uterine mole, development of the organ has gone to so great an extent that the existence or non-existence of pregnancy can be determined with much precision.

In those cases where pregnancy exists in connection with morbid conditions, the former is sometimes overlooked, not so much because the symptoms of such a state are absent, as that they are not so prominent as those of the diseased conditions. The latter are generally discerned without difficulty, and further investigation is neglected. In these complicated cases, should there be a suspicion of pregnancy, repeated careful examinations will either confirm or remove it; and no measures should be adopted for the treatment of disease in women, which would be prejudicial to the pregnant state, without the possible existence of such a state being excluded.

Diagnosis of Fœtal Death.—This is a highly important consideration. The circumstances which may give rise to a suspicion that the fœtus is dead are: 1. Absence of fœtal movements. 2. Absence of the fœtal heart-sounds. 3. Diminished size and increased softness of the uterus. 4. Engorgement, succeeded by flaccidity of the mammæ. 5. Sensation of weight and coldness in the abdomen. 6. Debility and general ill feeling. 7. Peptonuria.

Concerning the first, we need not hesitate to declare it wholly unreliable, and when once active uterine effort has begun, it is devoid of significance. With respect to the second, it should be understood that in certain cases, the sounds of the fœtal heart are inaudible for a considerable period, while yet the child is vigorous. The physical signs, 3 and 4, may depend upon causes which do not involve fœtal death, while numbers 5 and 6, being subjective symptoms, are of very slight relative value. Sign number 7 is said to be quite constant.

"Certainty of death having taken place," says Schroeder, "is obtained only when the os is open and allows the loose cranial bones to be felt distinctly; also, when the sounds of the fœtal heart, which, in the absence of other pathological conditions, can always be distinguished by a *repeated careful examination,* cannot be heard."

SIGNS OF FŒTAL DEATH EVINCED DURING LABOR.—After labor has begun, the signs of fœtal death have reference only to the child itself, and they are generally so clear as to dispel all doubt. 1. The results of auscultation are almost conclusive, since, during parturition, the conditions favorable for the transmission of the fœtal heart-sounds are at their best, and can hardly fail to be successfully made use of by even a novice. 2. On the head of a dead fœtus no caput succedaneum is formed. The presence of such tumefaction is conclusive evidence of life, as it is the effect of long-continued pressure, and circumscribed arrest of circulation. 3. The scalp of a dead fœtus is flabby and soft; the bones are movable and overlap more than usual; their edges feel sharp, and on pressure communicate to the fingers a grating sensation. The heads of poorly nourished, but living children, sometimes present these peculiarities. 4. The presence of meconium, and the escape of thin, slimy, offensive liquor amnii, afford additional proof of death.

If the breech presents, the sphincter ani is relaxed, and does not contract on the finger. The epidermis is blistered, and is

easily rubbed off with the finger, if the child has been dead more than a day or two. This is also true of other surfaces.

If the face presents, the lips and tongue are flabby and motionless. In arm presentations, there is no swelling, no lividity, no motion, and no warmth. In prolapse of the funis, the cord is flaccid, cold and pulseless.

In rare instances cadaverous rigidity has been observed.

Proofs of Former Pregnancy and Labor.—The permanent changes wrought by pregnancy and labor, which remain as evidence of the ordeal, should be remembered.

The integument covering the abdomen, which has once been stretched by development that went to full term, never again wholly regains its tenseness, but, even during a certain degree of redistension due to a second pregnancy, it may be gathered in rolls by the hand. The silvery lines found upon it never disappear, and the new marks which may be added are, when fresh, of a purplish color.

Discoloration of the areola about the nipple is more or less permanent, and such appearance observed in the early weeks of gestation should be regarded as significant, since it is not found primarily among the early signs. The mammæ themselves lose their original hardness and regular outline, often becoming decidedly flaccid.

Uterine changes are marked, especially in the cervix, which remains permanently enlarged and the os much more patulous than formerly. Its cone shape is lost and it becomes more cylindrical. Owing to overdistension and slight laceration, the os presents an irregularity of surface which makes it quite distinctive.

The vulvar opening is larger and the carunculæ myrtiformes are developed.

With a knowledge of these permanent changes in mind we shall usually have little difficulty in determining the question of former pregnancy. Yet it must be remembered that these changes are the result of gestation which goes to a late period, and hence their absence is not positive evidence that pregnancy has never existed. After miscarriage at the third or fourth month, none of these evidences would be found, save perhaps those in the os uteri.

Diagnosis of Fœtal Presentations and Positions.—It is highly important to know, as early as possible after labor sets in, the presentation and position of the fœtus. If the present-

ing part has been driven downwards into the pelvic cavity, and the membranes have ruptured, they can usually be learned by a vaginal examination, without much difficulty. But if descent of the presenting part has not yet been accomplished; if there is a tense and full bag of waters, and if the os uteri is but partially dilated, and is reached with difficulty, such diagnosis is not, in every instance, easily made even by experts. In a case of this kind it will be necessary to bring to our aid the information derivable from external examination.

EXAMINATION THROUGH THE VAGINA.—In the vast majority of cases positive information can be gained from vaginal exploration alone; but in some instances its revelations, as ordinarily obtained, are most unsatisfactory. One not thoroughly familiar with the feel of the characters of the various presenting surfaces will do well to verify conclusions by external means.

The head is recognized from its shape and hardness, which differ from those of any other presenting part. To the inexperienced these may not be wholly characteristic, for students and young practitioners have often mistaken the head for the breech, and the breech for the head. The breech, when fairly crowded into the pelvic brim, or cavity, does give a feeling of resistance, which, to a casual examiner, is liable to prove deceptive. An attentive observer of course will rarely, if ever, be misled. But these remarks do not apply with equal force to both varieties of cephalic presentation, since the vertex possesses characters not associated with the face. The vertex will be distinguished mainly by its sutures and fontanelles. As the finger is passed through the os uteri and rests upon a fontanelle, it is most frequently the posterior, and it will be recognized by its Λ shape, which is generally easily felt. From the apex of this figure the finger passes along the sagittal suture to its extremity, where the anterior fontanelle will be found. The face will be recognized from the feel of mouth, nose, chin and eyes, though these features will be considerably obscured by the pressure to which the part is subjected, and the consequent tumefaction. Such presentation is more likely to be confounded with breech presentation than any other, and differentiation must be made by a detailed study of the parts, as the fingers are swept over them.

When the pelvic end of the fœtus is turned to the os uteri, the feet or knees may be in advance, or, what is more frequent, the breech presents.

The features of this part can scarcely be mistaken. At first one natis only is found, but, when the os uteri opens, the other is felt, and the cleft between the two. The genitals, the point of the coccyx, the anus, and the rudimentary spines of the sacrum, pass under inspection, uniting to disclose the character of the presentation.

In transverse presentation, the precise surface upon which the examining finger falls can generally be made out, though not always with facility. The side should be recognized from feeling the ribs, and the shoulder by finding the scapula and vertebræ, and by its own peculiar contour. In early examination the presenting part often lies entirely out of reach. This is a diagnostic fact of much value.

Upon examining *per vaginam* in these cases, we find, when the feet or knees present, that, early in labor, diagnosis is many times a matter of some difficulty, inasmuch as an extremity is felt, but it moves before the finger, and will not admit of tactile study. Later, however, it comes within reach, sometimes suddenly, by rupture of the membranes, and escape of the liquor amnii. The foot is distinguished mainly by the toes and heel, and the knees are known from their size, and obtuseness.

When the presentation is either transverse or pelvic, the bag of waters is larger and longer,* and thorough exploration correspondingly difficult.

DIAGNOSIS OF PRESENTATION AND POSITION BY ABDOMINAL PALPATION.—This subject has received considerable attention of late, and its value during pregnancy, for the purpose of diagnosis, has been clearly demonstrated. Dr. Paul F. Mundé has furnished a most interesting and valuable paper on the subject, with some very excellent illustrations. Dr. De Paul has likewise given some important instruction concerning its value and methods, with figures.

According to the writers mentioned, and others, a little practice will enable one to elicit, by means of abdominal palpation, most valuable information concerning both presentation and position of the fœtus. Examination ought first to be with reference to the direction of the long uterine axis. If that corresponds closely with the longitudinal axis of the woman's body, the presentation must be either cephalic or pelvic. By spread-

*This clinical sign has its exceptions; hence, while possessing intrinsic value, it is not to be regarded as pathognomonic.

ing the hands over the uterus, a sense of greater resistance and fullness can generally be felt more to one side or the other, which represents the situation of the fœtal back. By deep

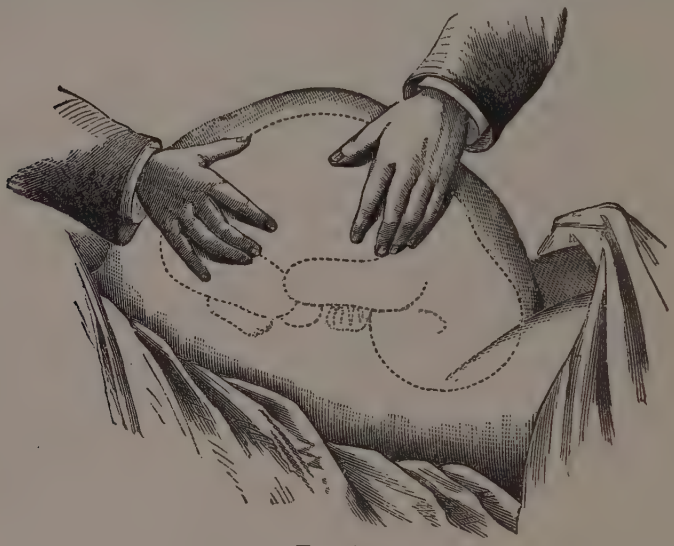


FIG. 88.

palpation with a single hand on the hypogastrium, the head of the fœtus, if presenting, can be felt, and recognized by its form

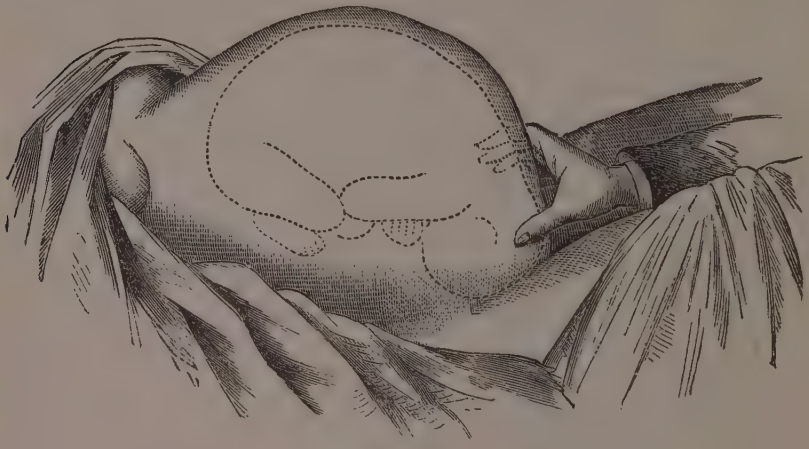


FIG. 89.

and hardness. By striking the tips of the fingers suddenly inwards at the fundus, the breech can generally be made out, or the head, if there, be felt still more easily. It is also possible, in

most cases, to find the fœtal limbs, especially on provoking movements. When the fœtus lies in a transverse presentation, diagnosis is still less difficult. The long fœtal axis being thrown across the abdomen, gives to the part a feel wholly different from that found in connection with other presentations. The cephalic globe can easily be fingered in one iliac fossa or the other, or at a higher point.

Diagnosis of Presentation and Position by Abdominal Auscultation.—This is another means of diagnosis not properly valued or understood by obstetric practitioners. For general purposes the unaided ear will answer very well; but for



Fig. 90.

the diagnosis of presentation and position, the stethoscope is a necessity, as without it the summum of intensity of the sounds cannot be circumscribed. The most common location of the fœtal heart-sounds is on the left side below the umbilicus, 1. Because the back of the child is most frequently turned towards the mother's left, and 2. Because the head commonly presents at the os uteri. The first fact, then, to be kept in mind is that when the fœtal back is turned towards the left side of the mother, the heart-sounds will be most distinctly audible on that side. The just inference to be drawn from this is not that the position is necessarily a left dorso-anterior one, though it is more likely to be. It may be a left dorso-posterior position, with but a moderate inclination backwards. Accordingly we conclude when the sounds of the fœtal heart are most distinct on the mother's left side, that the position is either a left

dorso-anterior, or a left dorso-posterior position; in other words, it is a first or a fourth position, with the probabilities strongly in favor of the former. If heard most clearly at a point an inch or more below the line of the umbilicus, the woman being near term, it is a cephalic presentation; if heard most distinctly at a point as high as the umbilicus, or higher, it is a breech presentation. When the summum of intensity of the fœtal heart-beat is on the right side, the position is either right dorso-anterior, or right dorso-posterior; or, in other words, it is either a second or a third position, without regard to the presentation. But now, if the point of clearest audibility is on or below a line drawn transversely across the abdomen about an inch below the umbilicus, the woman being near term, it is almost certainly a cephalic presentation. If the sounds are most distinctly audible at a point above the umbilicus, it is equally certain that the presentation is pelvic.

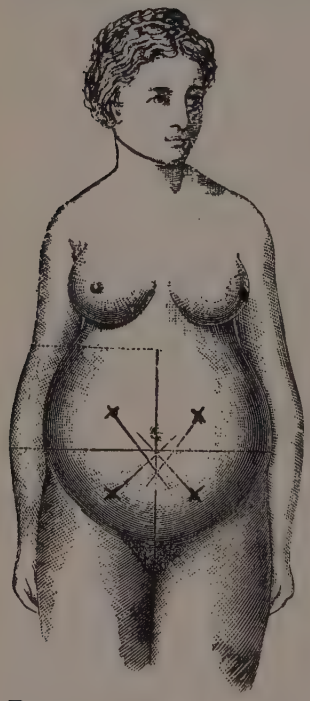


FIG. 91.—Showing at + the most common locations of the fœtal Heart-sounds.

In transverse presentation the fœtal heart is heard most distinctly on or near the median line of the abdomen, several inches below the umbilicus.

Diagnosis of Twin Pregnancy through Auscultation.—In twin pregnancy, the fœtuses lie upon either side of the abdomen, and from mere inspection a diagnosis can sometimes be made. The stethoscope will be applied to one side, perhaps the left, below the umbilicus, and the sounds there heard counted by the watch. The investigation is still further pursued, and on the opposite side of the abdomen, perhaps on a line with the first sounds, but more likely at a higher point, a fœtal heart of a different rhythm is heard, and its pulsations counted. From such an examination we infer with great confidence that there are two fœtuses in utero, and furthermore that their positions, and perhaps their presentations, vary. The same principles of

diagnosis of presentation and position are here involved, as in the instance of single pregnancy. In the same connection it



FIG. 92.—First position of the Vertex. Location of heart-sounds indicated by +.



FIG. 93.—First position of the Face. Location of heart-sounds indicated by +.



FIG. 94.—First position of the Breech. Location of heart-sounds indicated by +.



FIG. 95.—Dorso-anterior position of Transverse Presentation. Location of heart-sounds indicated by +.

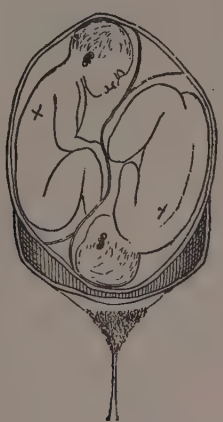


FIG. 96.—Twin Pregnancy. Location of heart-sounds indicated by +.

should be borne in mind that the dorsal surfaces in twin pregnancy, are, as a rule, turned in opposite directions.

The presentations are also different in about forty per cent. of twin pregnancies, so that the heart-sounds are most frequently found at corresponding heights on the abdomen.

These ideas of presentation and position, derivable from palpation and auscultation, are not theoretical merely, but highly practical, as the author has demonstrated in hundreds of cases within the Obstetrical Department of Hahnemann Hospital, Chicago, as well as in private practice.

Diagnosis of Sex from Rapidity of the Fœtal Heart.—The possibility of determining with tolerable accuracy the sex of the fœtus in utero from the rapidity of the heart's action, has commanded the confidence of some, and is deserving of study. The theory is founded on the clinical observation that the heart of the female fœtus exceeds in rapidity of pulsation that of the male. That there is an element of truth in the theory is plainly shown by the reports of all who have given the matter attention, but experience of different observers has, nevertheless, been far from uniform. Steinbach was correct in forty-five out of fifty-seven cases which he examined, and Frankenhæuser made not a single mistake in fifty consecutive cases. But other careful observers fall far short of such marvelous success.

In studying the subject, one should not forget the influence of both maternal and fœtal states upon the heart's action. It is probably as true of intra- as of extra-uterine life, that such influences much more frequently accelerate than retard the cardiac contractions, and hence we often find the male heart simulating, in point of rapidity, the female heart. This affords a rational explanation of the greater relative frequency of males when the pulsations fall below 135½ to the minute, than of females when the pulsations exceed that number. That disturbance of the vital force of the fœtus, and its reduction to a low ebb, is exhibited in the pulsations, is clearly shown in carefully conducted observations. An instance of the kind appears in the succeeding tables. The mother was in very feeble health, and, two weeks prior to delivery, the heart of a male fœtus which she bore was pulsating so rapidly that it could scarcely be followed—172 times a minute. The child was still-born, near term, and presented evidence of life having been extinct for several days.

The author's personal observations in ninety-six unselected cases gave an average pulsation of 135½. The results of obser-

vations, with this as the intermediate point in the scale, are given in the accompanying table:

	Male.	Female.
Pulsations in excess of 135½	25	24
Pulsations below 135½	35	12
Total	60	36
Average pulsations of males		134
Average pulsations of females		138

According to these figures it will be observed that if diagnoses of sex had been made in accordance with the theory of cardiac rapidity alone, they would have been correct in only fifty-nine out of ninety-six cases, or in but little more than sixty-one per cent. of them.

As the proportion of males in these ninety-six cases is so far in excess of females, it appears that a comparative statement, constituting in some regards a more equitable showing, should be based on an equal number of males and females. In order to present such a table, we have taken the entire number of females (36), and compared it with a like number of males taken in regular order from the records, first in chronological order, and secondly in reverse order, with the following results:

COMPARATIVE STATEMENT OF THE FŒTAL HEART-SOUNDS IN THIRTY-SIX MALES, TAKEN IN CHRONOLOGICAL ORDER FROM THE AUTHOR'S RECORDS, AND THOSE OF THE ENTIRE THIRTY-SIX FEMALES IN THE FOREGOING LIST:

Cases wherein the pulsations exceeded the average number of 135½ per minute:
Males, 14—about 37 per cent.
Females, 24—about 63 per cent.

Cases wherein the pulsations fell below the average number of 135½ per minute:
Males, 22—about 65 per cent.
Females, 12—about 35 per cent.

A COMPARATIVE STATEMENT SIMILAR TO THE FOREGOING, THE THIRTY-SIX MALES BEING TAKEN FROM THE RECORDS IN REVERSE CHRONOLOGICAL ORDER:

Cases wherein the pulsations exceeded the average number of 135½ per minute:
Males, 13—about 34 per cent.
Females, 25—about 66 per cent.

Cases wherein the pulsations fell below the average number of 135½ per minute:
Males, 23—about 68 per cent.
Females, 11—about 32 per cent.

These observations were made in hospital practice, and the unusual proportion of male children is not easily explained on any other basis than the recognized preponderance of that sex among the illegitimate:

Pulsations of Fœtal Heart.	Male.	Female.	Pulsations of Fœtal Heart.	Male.	Female.
110	1	0	138	4	2
116	1	0	140	9	6
120	0	2	142	5	5
122	4	0	144	2	0
124	1	1	146	1	1
126	5	1	148	0	4
128	3	2	150	0	1
130	10	1	160	0	1
132	5	3	162	1	1
134	5	2	172*	1	0
136	2	3			
Totals				60	36

Mother's Age.	Average Pulsations.	Male.	Female.	Mother's Age.	Average Pulsations.	Male.	Female.
14	120	0	1	26	144	1	1
16	141	1	2	27	126	2	0
17	136	3	2	28	136	1	2
18	137	1	2	29	123	3	0
19	135	4	3	30	134	2	5
20	138	6	4	32	136	1	0
21	137	8	5	34	136	1	0
22	132	13	2	35	142	0	1
23	145†	5	1	37	160	0	2
24	137	5	2	38	132	1	0
25	130	2	1				
Totals						60	36

*Case of dying fœtus mentioned.
†Dying fœtus raised the average.

CHAPTER V.

THE DURATION OF PREGNANCY.

This is a subject which has elicited much study and discussion. In settling it on a firm scientific basis, the main obstacle has been the impossibility to ascertain the precise date of fertile coitus. In hospital practice, the majority of women entered for confinement are living outside the conjugal relationship; have been leading lives of repeated exposure to impregnation, and are unable to offer positive testimony as to the date of conception, even if so disposed to do. Others, both in and out of hospitals, who are unmarried, profess to have been guilty of but a single misstep, and are prepared to give precise dates; but we must withhold from such full credence, since the motive prompting them to misrepresentation is so powerful. The married state presents obstacles to absolute calculation fully as great as those just enumerated. On account of the difficulties in the way of trustworthy observation, it has become customary to base calculations on the date of the last menstruation. The fallacies associated with such figures are conspicuous. First, the date of the last menstrual return cannot be held to represent the real time of impregnation, or even of insemination, in more than a very small percentage of cases, since sexual congress during menstruation is avoided by both parties to the act. Moreover, the time of insemination does not correspond to the date of impregnation, inasmuch as the time consumed by the spermatozoa in journeying from the vagina to the point of contact with the ovum represents a period varying from a few hours to a few days. Again, it is admitted by physiologists that fertile coitus may both precede and succeed the menstrual return, by a few days. Should it precede, the flow which was so near may be prevented, and a miscalculation made by basing the figures on the date of the last menstruation. Or the flow may come on at the usual time, even though impregnation has existed for several days. Allusion should here be made, also, to those anomalous cases wherein conception is succeeded for two, three, or four months by regular menstrual returns. Hence it appears that, at best, such a basis of calculation is not settled nor reassuring.

We gather some information concerning the average duration of pregnancy from a study of comparative physiology.

Valuable observations have been made in the case of certain domestic animals, in whom one coitus coincides with the period of rut. In 1819, M. Tessier submitted to the Académie des Sciences at Paris the results of a series of investigations of this nature, which are worthy of attention. Of 140 cows—

14	calved	between	the	241st	and	the	266th day.
53	"	"	"	269th	"	280th	"
68	"	"	"	280th	"	290th	"
5	"	"	"	290th	"	308th	"

Gestation in cows is but little more protracted than in women, and according to this table, founded on exact observations, there was an extreme difference in duration of pregnancy amounting to 67 days. Lord Spencer made a series of observations of a similar nature in the case of mares. Of 102 mares—

3	foaled	on	the	311th	day.	
1	"	"		314th	"	
1	"	"		325th	"	
1	"	"		326th	"	
2	"	"		330th	"	
47	"	between	the	340th	and	350th day.
25	"	"	"	356th	"	360th "
21	"	"	"	360th	"	377th "
1	"	on	"	394th	day.	

In neither of these tables has allowance been made for the contingency of premature labor, which probably widens the extremes; but when a reasonable number has been deducted, on the strength of this presumption, there still remains evidence of widely variable results. It may be said in favor of the tables as exhibited, that, in the animals mentioned, it is highly probable that the influences generally regarded as productive of premature labor were not as numerous, nor as powerful, as those to which women are subjected.

Dr. Reid collected thirty-nine, and Dr. Montgomery fifty-six cases, in which pregnancy was calculated from a single coitus, with the following results:

Reid.	Montgomery.	Total.	Duration.
0	1	1	36 weeks, or 252 days.
1	2	3	37 " 259 "
6	2	8	38 " 266 "
7	10	17	39 " 273 "
18	22	40	40 " 280 "
2	9	11	41 " 287 "
3	8	11	42 " 294 "
2—39	2—56	4—95	43 " 301 "

While there are grave doubts of accuracy in many of these cases, and hence of the table as a whole, some of them are worthy of most implicit trust. Dr. Montgomery relates the case of a lady who went to the sea-side in June, 1831, leaving her husband in town. He visited her for the first time November 10th, and returned to town on the succeeding day. She quickened on the 29th of January, 1832, and was delivered August 17th, exactly two hundred and eighty days from the time of the last sexual intercourse, which was preceded by an interval of nearly five months.

Considering the remarkable care and precision exercised by these observers, it seems probable that the results, as shown, approximate very closely the real facts, and from them we learn that there is a wide variation in the duration of pregnancy. In addition to the above, there are several cases recorded where delivery of what appeared to be fully developed children occurred as early as 260, and as late as 284 days after a single coitus, so that we are led to conclude that pregnancy does not run a course with uniform limits.

Schlichting has examined 456 cases in which the day of copulation was known, and in which the children were full term. He found an average duration of 270 days, but the extremes were very wide.

But as it is rarely possible to determine the date of fertile coitus, the calculation and experience of the duration of pregnancy must rest chiefly on observations, the starting point of which is the last day of the last menstruation. Dr. Merriman has accordingly conducted and recorded a series of investigations, which are here tabulated. Of the 150 mature births observed by him—

5	were delivered in the		37th	week	255th to 259th day.
16	"	"	38th	"	260th to 266th "
21	"	"	39th	"	267th to 273rd "
46	"	"	40th	"	274th to 280th "
28	"	"	41st	"	281st to 287th "
18	"	"	42d	"	288th to 294th "
11	"	"	43d	"	295th to 301st "
5	"	"	44th	"	the latest being the 306th day.

A difference of fifty-one days between extremes is here shown. Dr. James Reid has given a table of 500 cases, in which

the calculation is also from the last day of menstruation. Of these—

23	were delivered	in the	37th	week . . .	255th to 259th day.
48	" "	"	38th	" . . .	260th to 266th "
81	" "	"	39th	" . . .	267th to 273d "
131	" "	"	40th	" . . .	274th to 280th "
112	" "	"	41st	" . . .	281st to 287th "
63	" "	"	42d	" . . .	288th to 294th "
28	" "	"	43d	" . . .	295th to 301st "
8	" "	"	44th	" . . .	302d to 308th "
6	" "	"	45th	" . . .	309th to 315th "

The difference between extremes is here sixty days. With these, and other equally reliable facts before us, we are led to the conclusion that the average duration of pregnancy is in the vicinity of 278 days, though the variations are extensive.

THE MINIMUM.—It is interesting and important to know what is the shortest time within which a child may be born alive, and have a fair chance of life. In cases of contemplated induction of premature labor for conservative purposes, the minimum time allowed the fœtus is 230 to 250 days, but cases are on record in which life has been sustained when birth took place at a much earlier period. The following table by Dr. Montgomery will prove of interest because of the information on this subject which it affords:

No.	Last Menses.	Date of Concep'n.	Birth.	Duration of Gest'n.	Days.	Survival of Child.
1	Oct. 9	Oct. 9	Apr. 3	5 M. 10 D.	161	Twelve hours.
2		Aug. 24 married	Mar. 3	5 " 21 "	174	A week.
3		July 22 married	Jan. 18	5 " 27 "	180	131 days.
4				6 "	183	Seven weeks.
5	Apr. 10	Apr. 10	Oct. 16	6 " 9 "	189	Eleven years.
6		Apr. 1	Oct. 10	6 " 13 "	193	Doing well 6 m. afterward.
7		Jan. 31	Aug. 14	6 " 16 "	196	Thirty years.
8		Jun. 12	Dec. 27	6 " 18 "	198	Two years.
9		Oct. 24	May 10	6 " 19 "	199	Eleven days.
10		Aug. 22	Mar. 18	6 " 21 "	201	Thirteen years.

THE MAXIMUM.—That pregnancy is sometimes protracted beyond the usual period seems now an established fact. We are nevertheless told that little more than fifty years ago opinions very different from those which now prevail were held by the best obstetricians. In the Gardner peerage case which came

before the House of Lords, England, in 1825, Drs. Gooch and Davis, and Sir C. Clark, testified that, in their judgment, the period of 280 days was never exceeded. Subsequently, with a view to ascertain the experience of those who were most likely to have paid particular attention to the subject, upwards of forty of the most eminent obstetric practitioners in London, Dublin and Edinburgh, were applied to by Dr. Reid. The large majority of these expressed a firm conviction as to the occasional extension of the usual period of pregnancy by a few days beyond 280. Several had met with one or two cases of protracted gestation, out of many hundred, on the exact data of which they could rely; others, who had not kept notes of their cases, could not offer positive testimony, but had no doubt that in some cases the period had been extended. Some, who had had extensive private and hospital practice, stated that they had never met with an undoubted case of protracted gestation; while two affirmed their strong conviction that no case ever exceeds the 280th day from conception, and one, that pregnancy is never carried beyond the ninth calendar month.

Without permitting this subject to take up too much space, it may be remarked that there are on record undoubted cases of protracted gestation, though they are probably rarely met. Many of the cases adduced are valueless, because founded on insufficient data, but cases have been reported which merit our acceptance.

There are many careful observers who put no credence in alleged examples of prolonged gestation. "We therefore say," remarks Charpentier, "with all other authors, that prolonged pregnancy, the fœtus being alive, does not exist as a physiological condition. It exists only in cases like the following: 1. In extra-uterine pregnancy; 2, In cases of dead fœtus retained in utero, as in instance of abortive ova; 3. Finally, in cases where a dead fœtus is retained by obstacles to parturition seated at the cervix. Even in such cases, prolonged pregnancy is very exceptional."

Prediction of Date of Confinement.—The average duration of gestation after cessation of the menstrual flow, has been found to be 278 days. Various methods of calculation have been suggested, and sundry periodoscopes and tables have been given, with a view to facilitate the prediction, and make it more accurate than it could be without them, some of which are based on an average of 278 and some of 280 days.

Dr. Matthews Duncan, who has devoted much study to the prediction of the time of labor, has given a method of calculation based on an average of 278 days, which is very convenient and practical. His rule is: "Find the day on which the female ceased to menstruate, or the first day of being what she calls 'well.' Take that day nine months forward as 275, unless February is included, in which case it is taken as 273 days. To this add three days in the former case, or five if February is in the count, to make up the 278. This 278th day should then be fixed on as the middle of the week, or, to make the prediction more accurate, of the fortnight in which the confinement is likely to occur, by which means allowance is made for the average variation of either excess or deficiency.

Naegele's method is to figure from the first day of the last menstrual period, and then count forwards nine months, or backwards three months, and to this date add seven days to complete the period of 280 days.

The following table by Dr. Protheroe Smith is easily understood, and is probably fully as serviceable as any:

TABLE FOR CALCULATING THE PERIOD OF UTERO-GESTATION.

	NINE CALENDAR MONTHS.		TEN LUNAR MONTHS.	
From	To	Days.	To	Days.
January 1	September 30	273	October 7	280
February 1	October 31	273	November 7	280
March 1	November 30	275	December 5	280
April 1	December 31	275	January 5	280
May 1	January 31	276	February 4	280
June 1	February 28	273	March 7	280
July 1	March 31	274	April 6	280
August 1	April 30	273	May 7	280
September 1	May 31	273	June 7	280
October 1	June 30	273	July 7	280
November 1	July 31	273	August 7	280
December 1	August 31	274	September 6	280

The above obstetric "Ready Reckoner," consists of two columns, one of calendar, the other of lunar months, and may be read as follows: A patient has ceased to menstruate on July 1; her confinement may be expected at soonest about March 31 (*the end of nine calendar months*), or at latest April 6 (*the end of ten lunar months*). Another has ceased to menstruate on January 20; her confinement may be expected on September 30, plus 20 days (*the end of nine calendar months*), at soonest; or on October 7, plus 20 days (*the end of ten lunar months*), at latest.

THE DATE OF QUICKENING.—Even when it is impossible to establish the date of the last menstrual period, the time of quickening can sometimes be recalled by the woman, in which case it is customary to add twenty-two weeks for the purpose

of determining the proximate day of delivery. But quickening is a sign of pregnancy which does not always develop in the eighteenth week, and the extreme variation in its manifestation in different women and different pregnancies, renders this method of calculation a very uncertain one. We have heard patients declare that movements were felt in certain pregnancies as early as the third month, while others were not conscious of them until the fifth or sixth month.

Prediction of Time of Labor from Size of Uterus.—From abdominal palpation we may gather important data upon which to venture a prediction of the time of expected confinement. According to common bedside teaching, the uterus in the second month is of the size of an orange; in the third month, of the size of a child's head; in the fourth month, of the size of a man's head, and can be felt above the symphysis pubis. In the fifth month, the fundus of the uterus rises to a point midway between the symphysis and the navel. By the sixth month it reaches the level of the navel. In the seventh month, it should be the breadth of two or three fingers above the navel. In the eighth month, it mounts to a point half-way between the navel and the epigastrium. In the ninth month it reaches the epigastrium. In the tenth month, two or three weeks before confinement, the uterus sinks downward and somewhat forward, so that its upper level corresponds very nearly to that of the uterus in the eighth month.

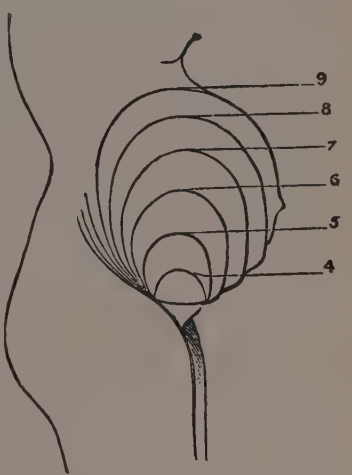


FIG. 97.—Size of the Uterus at various periods of pregnancy.

The fallacy in this mode of describing the progress of uterine development, as discovered through the abdominal parietes, is that the navel is not a fixed point, and its distance from the symphysis is steadily increased up to a late period in pregnancy. A more accurate manner of describing the height of the fundus is followed by Spiegelberg with the following results:

From the 22d to the 26th week . . .	8½ inches.
" " 22d to the 28th week . . .	10½ "
" " 22d to the 30th week . . .	11 "

From the 22d to the 32d and 33d weeks	.	11½ inches.
" " 22d to the 34th week	. . .	12 "
" " 22d to the 35th and 36th weeks	.	12½ "
" " 22d to the 37th and 38th weeks	.	13 "
" " 22d to the 39th and 40th weeks	.	13¼ "

The size of the uterus varies greatly in different women at the same stage of gestation, but the above average measurements are somewhat excessive. From accurate recorded observations made by the author, the figures which approximate the true average more closely are those which follow:

From the 16th to the 20th week	.	6 to 6½	inches.
" " 20th to the 24th week	. .	7 to 8	"
" " 24th to the 28th week	.	9½ to 10	"
" " 28th to the 32d week	. .	10 to 10½	"
" " 32d to the 36th week	.	11 to 11½	"
" " 36th to the 40th week	. .	12 to 12½	"

The facts here presented may aid materially, when taken in connection with other conditions, in fixing upon the probable time of delivery.

CHAPTER VI.

PSEUDOCYESIS.

Pseudocyesis—false, spurious, or phantom pregnancy—has been defined by one as a "mental delusion, resulting in a false interpretation of bodily sensations, experienced for the most part in the abdomen." It may be justly regarded as a delusory conviction of pregnancy, based upon, or giving rise to, symptoms which, in some instances, closely resemble those of true gestation. It is not always a mere assumption which will readily yield to the force of an ordinary negative from the medical attendant; but a settled conviction, strong enough to divert the course of nervous impulses, and thereby magnify or develop presumptive symptoms of pregnancy, and, sometimes, even parturition. A similar mental impression may lead a woman to believe that she is the subject of an abdominal tumor.

Care should be taken not to confound spurious pregnancy with "false conception," since there is a wide difference between the two states, the latter being nothing more nor less than molar pregnancy.

Dr. Matthews Duncan directs attention to the fact that some of the lower animals, such as bitches, exhibit signs of spurious parturition. Reviewing the subject of pseudo-pregnancy, in his terse and lucid manner, he very properly, as we believe, emphasizes the thought that distinction ought to be made between those cases where there is merely spurious pregnancy, and those in which the patient's vivid imagination, strong with the delusion, carries her to a culmination of the supposed pregnancy in fancied or spurious labor. Dr. Reamy mentions a case where not only was a midwife kept two nights watching by the bedside of a woman who was the subject of phantom pregnancy, but a practitioner, doing a large business, actually shared with the midwife for several hours, the honor of supporting the perineum. Both declared that not only were the pains severe, but that the perineum actually bulged from what was supposed to be the fœtal head.

CONDITIONS OF DEVELOPMENT.—The anomaly of spurious pregnancy is observed in women of various ages. Dr. O'Farrall mentions a case which occurred in a girl of only

thirteen years. Dr. Churchill records one which happened in a young lady of seventeen.* Sir J. Y. Simpson, who was the first to give a detailed description of spurious pregnancy, elucidate its causes, and prescribe its treatment, thinks the complaint is as frequent the first year after marriage as at any other time. Dr. Montgomery believes it to be most frequent at the climacteric period. Melancholy instances of the kind have been observed in aged spinsters and widows, who had long passed the menopause, in whom life was rendered intolerable by reason of this harrowing delusion.

ETIOLOGY.—The excesses of early married life, and the physical and psychical changes incident to this period in a woman's existence, afford, in the susceptible, an excellent basis upon which to frame a false conviction of pregnancy. The same is also true of the disturbed physical and mental equilibrium attendant on the climacteric period. It seems clear, also, that a consciousness in the unmarried of having been exposed to the risk of impregnation, and the impugnings of a guilty conscience, contribute to settle and fix the unpleasant delusion.

The latter may operate as powerful predisponents to the physical and mental states and symptoms which point so impressively to a pregnant condition; but it is probable that in many instances there is a transposition of cause and effect. In one example, the physical symptoms which characterize the case are doubtless the result of a previous mental state, being physical expressions and sequences of a settled delusion, while

*The remarkable influence of mind over bodily states, evincing itself in the development of physical signs of pregnancy, is so well illustrated in the following case, reported by Dr. Reamy, that we give it in full: "A beautiful and refined girl, 20 years of age, from an adjoining State, was placed under my charge. She imagined that, on a certain night, specified and clearly designated circumstantially to her mother and a married sister, her room had been entered by two men, one of whom had chloroformed and the other ruined her. She had read a few days before a false and sensational article detailing the particulars of a similar atrocity. When I examined her four months after her supposed pregnancy had occurred, she was pale, anæmic, nervous, amenorrhœal. Her countenance was the picture of despair. At times the abdomen was large, then decidedly flat. The mammæ were swollen, and contained milk. She suffered from nausea every morning and was conscious that for the past few days she had felt violent movements in the abdomen. The friends were constantly in dread that she might commit suicide. Ferruginous tonics with generous diet, bathing, air, exercise, etc., were tried without avail. Her general health did not improve, and no argument or assurance could convince her of her delusion. On every other subject she was perfectly rational. Finally, after five months from the date of her supposed pregnancy had elapsed, I took into her room a manikin, the articulated bony and ligamentous pelvis, with Schultz's obstetrical plates. I, by this means, succeeded in demonstrating to her the impossibility of pregnancy at five months' advancement without greater abdominal enlargement. I spent in this demonstration at least an hour, going over and over the ground. It was in the presence of her mother. Success rewarded me. She was convinced of her delusion. The fear never returned. She gained eighteen pounds in weight in three weeks. The menstrual function was at once established."

in another, the mental impression is, as in real pregnancy, consecutive on observed physical conditions. In the latter instance, it is doubtless true that the bodily state is modified in great measure by the rooted notion which originated from physical phenomena. Dr. Simpson says that "the aggregate of the symptoms which we class under the designation of spurious pregnancy in women, is in some way or other dependent upon the changes which occur in the ovaries and in the uterus at the period of menstruation." Another careful observer remarks that "it will be found that in most of those persons who fancy themselves pregnant, there is a marked derangement of the circulatory, digestive and nervous systems, either one or all being usually implicated."

SYMPTOMS.—The phenomena observed in spurious pregnancy are worthy a careful study. In the majority of cases, there is unusual flatulence, and some writers have accordingly attributed the abdominal symptoms to this condition. Simpson does not incline to that view, but regards the phenomenon of abdominal distension as probably dependent "on some affection of the diaphragm which is thrown into a state of contraction, and pushes the bowels downwards into the abdominal cavity." There is tympanites; but it is not evident from reported cases that either the area of resonance, or the percussion note, differs essentially from that often met in the non-pregnant state. Increased prominence of the abdomen in some cases can be justly attributed to deposition of adipose in the abdominal parietes and omentum.

The movements which so closely simulate those of a fœtus are probably produced in some cases by flatus in the intestines; but they are oftener due to spasmodic muscular action. Dr. B. F. Betts relates a case wherein the movements were so vigorous as to be discernible through the clothing.

"By application of the palmar surface of the hands to the abdominal walls," says the doctor, "the recti muscles were found to be irregularly contracting, so as to appear at first as though they were pressed out by the movements of a child in utero, at irregular intervals. From an inspection, it was impossible to distinguish these contractions from the real movements of a fœtus, but by palpation, the tendinous attachments of the muscles to the brim of the pelvis were felt to be stretched, as from strong muscular contractions."

In some cases the abdomen is swollen to an extreme degree,

but these are exceptions to the rule. In palpating, the hand may meet with resistance, but this generally arises from contraction of the broad, flat muscles of that region. In a few reported instances there was a certain amount of tumefaction, which assumed the outline of a pregnant uterus.

Pseudo-pregnancy may continue for only a few weeks, and then wholly vanish, or it may persist for seven, nine, twelve or even eighteen months—perhaps longer. The similarity of some of the manifestations to those of certain nervous disorders of a hysterical type should not be overlooked. The strong mental impression, the exaggeration of sensations and conditions, the flatulency so often observed, and the state of nervous exultation, are all of this nature.

DIAGNOSIS.—The diagnosis of pseudocyesis will vary in precision according to the period of development which has been reached at the time of examination. In early gestation we have relative signs only upon which to base our opinions, and these, though in certain combinations they lend strong probability to our deductions, afford, after all, nothing more than presumptive evidence. A notion of existing pregnancy takes possession of a woman, and she presents herself for diagnosis. Gestation, if begun, is two or three months advanced. Some of the relative signs of that condition are found, giving color to the presumption, but the discreet physician will not express an unqualified opinion. On the contrary, there may be an absence of the most common presumptive signs of pregnancy, yet an unequivocal diagnosis of non-pregnancy would be unwise. At a later period a physical examination ought to yield unmistakable results. Abdominal distension, due to a tumor of some sort, may create in the woman's mind a conviction of pregnancy not easily eradicable, and symptoms closely resembling those of pregnancy follow on apace. In such cases the quartette of signs pathognomonic of the real condition, namely, fœtal movements, *ballottement*, fœtal heart-sounds and rhythmical uterine contractions, will go far to clear up the doubtful points.

It is not always possible to make a satisfactory examination in a case of doubtful pregnancy, without first bringing the woman under anæsthetic influences. When this has been done, since by it flatulency will in great measure be overcome, muscular spasm subdued and sensibility annulled, the abdomen will offer no resistance to deep palpation, nor the vagina to

thorough exploration, affording thereby conditions the most favorable for diagnosis.

Mention should also be made of the asymmetry, and incompleteness in the order of development and mutual relation of the signs. There is a lack of harmony in the assemblage of the phenomena, an irregularity or defect in the sequence, the grouping, and the character of the symptoms, creating in the observer an impression unlike that derived from a clinical study of the signs of real pregnancy. This is especially true with regard to the menstrual function, which is rarely suspended for the entire period. It is also worthy of notice that movements, inferentially fœtal, in many of these cases, are felt much earlier than those of real pregnancy.

TREATMENT.—The delusion which enthralls women in these interesting cases is not always easily removed. If a subject has confidence in her medical adviser, she will be persuaded, though perhaps reluctantly, to cast away her erroneous notions. It may be necessary for him to point out and elucidate the premises upon which his conclusions are based, and such an appeal to her reason will generally avail. In those cases where the conviction of pregnancy was derived from logical conclusions based upon insufficient data, there may not be marked physical improvement, even after the delusion has been dispelled, without suitable medicinal treatment.

If there was antecedent menstrual suppression, *pulsatilla, caulophyllum, apis* or *sulphur,* may be required to regulate functional activity in the generative sphere.

If the digestive apparatus is disordered, giving rise to flatulence, *china, lycopodium, nux vomica, nux moschata,* or *carbo vegetabilis,* may be needed.

If marked physical disturbance is found, we are more likely to unravel the tangled case by giving the symptoms arising therefrom a dominating influence in a selection of remedies. In the absence of these, or if we have good reason to believe that functional disorder is due to psychic influence, then the mental symptoms ought to be given more weight.

CHAPTER VII.

THE PATHOLOGY OF PREGNANCY.

Extra Uterine Pregnancy.—Pregnancy has few occurrences associated with it more disastrous in their results than the development of the ovum outside the uterine cavity. The frequency of laparotomy for the relief of pelvic hæmatocele has demonstrated the surprising frequency of this form of anomalous gestation. Veit was the first to find that at least twenty-eight per cent. of hæmatoceles result from extra-uterine pregnancy, and Tait declares that all his cases have been traceable thereto.

The spermatozoa having been deposited within the vulva, the vagina, or the cervical canal, make their way with variable rapidity through the uterine cavity and Fallopian tubes towards the ovaries. Fecundation, as has been stated, may occur at almost any point on the route, in the uterine cavity, in the Fallopian tubes, or at the ovaries; the most frequent point of contact between the male and female elements probably being in the outer third of the tubes. After impregnation, the ovum may be arrested in its progress towards the uterine cavity, and development take place, at the ovary, in the abdominal cavity, or in the tube. Accordingly we have ovarian, abdominal and tubal pregnancy, besides some minor varieties, the designations indicating the situations of the developing ova.

According to Bandl's statistics, extra-uterine pregnancy occurs only once in twelve thousand cases. Garrigues found two hundred cases recorded within four years.

OVARIAN PREGNANCY.—Careful observers have put upon record several cases where fecundation and development of the ovum took place within the Graafian follicle. When this occurs, the follicle may close, and development go on outside the peritoneal cavity, or the ovum may work its way through the aperture resulting from rupture of the follicle, and thus come eventually to lie chiefly within the peritoneal cavity. From the amount of distension to which the sac is subjected, rupture usually takes place within the early weeks of pregnancy, and the ovum enters the peritoneal cavity. Such an occurrence does not always prove fatal to ovular development, for the sac

walls are sometimes strengthened by adhesions to the peritoneum which covers adjacent viscera, and gestation goes on.

False Ovarian, or Tubo-Ovarian, Pregnancy.—When the ovum is arrested in the fimbriated extremity of the tube, the cyst structure is composed partly of the fimbriæ of the tube, and partly of ovarian tissue. This makes development less confined, and the pregnancy may continue, without rupture of the sac, to an advanced period, or even full term. This form much more nearly resembles abdominal than ovarian pregnancy. When none of the investing structures are ovarian, it is termed *tubo-abdominal.*



Fig. 98.—Abdominal Pregnancy.

Abdominal Pregnancy.—The etiology of abdominal pregnancy remains in doubt. It probably arises in some cases from the impregnated ovum being dropped directly into the peritoneal cavity, but in most instances very likely it is a secondary outgrowth from the tubal and ovarian forms. Dr. Barnes believes that it is never primarily abdominal, because of the difficulty of conceiving how so small a body as the ovum should be able to fix itself on the smooth surface of the peritoneum. The view is warmly supported by several close students of ectopic gestation. Some have supposed that abdominal pregnancy may originate from impregnation of an ovule already lying in the peritoneal cavity, by spermatozoa which have found their way thither. From all that has been observed, it is highly probable that it is no uncommon thing for an ovule to fall into the peritoneal cavity, and there, after an uncertain

time, perish, without giving rise to any disturbance; but when, from fertilization, it does survive, a connective-tissue proliferation is set up which invests the ovum with a vascular sac, thereby forming a decidua reflexa of peculiar construction. The latter often attains a thickness nearly as great as that of the uterine walls. The chorion villi sprout, form attachments to the sac and other structures, and eventually develop a placenta. The walls of the sac and the ovum generally develop *pari passu*, and extend into the abdominal cavity, forming adhesions to the intestines, the mesentery, the omentum, the uterus and other structures. Occasionally the ovular development proceeds without the formation of pseudo-membranes, the coverings of the fœtus being only the amnion and chorion.

Rupture of the fœtal coverings usually takes place in extra-uterine pregnancy, and the fœtus passes into the peritoneal cavity. Death of both embryo and mother generally follows, but, in other instances, the woman surviving, development is continued by the formation of a new sac. When fœtal death succeeds such an accident, the child may be converted into a lithopædion, or the vascular connective tissue surrounding it may preserve the soft structures for years. The precise seat of attachment in abdominal pregnancy varies considerably. The placenta has been found fixed, at different times, to most of the abdominal viscera, to the iliac fossa and to the structures within the true pelvis. Its most frequent site is the recto-uterine space.



FIG. 99.—A Lithopædion.

INTERSTITIAL PREGNANCY.—When development of the ovum takes place in the uterine portion of the tube, it is called "interstitial pregnancy." This portion of the tube is about seven lines in length. From hypertrophy of the muscular walls a sac is formed about the ovum, which projects from the involved angle of the uterus. Ovular development, however, is so much more rapid than the muscular, that rupture generally occurs before the fourth month.

When the fecundated ovum is arrested near the outer boundary of the uterine part of the tube, as development proceeds

the tumor escapes mainly into the tube, producing what has been called *tubo-interstitial pregnancy*. When development takes place on the borders of the uterine cavity, the resulting tumor may crowd through the Fallopian opening and lodge in the uterus, only to be finally expelled as in ordinary abortion.

Diverticuli sometimes exist in the uterine wall, with small openings into the Fallopian tube, into which the impregnated ovum has been known to enter, and a peculiar kind of interstitial pregnancy result.



FIG. 100.—Interstitial Pregnancy.

TUBAL PREGNANCY.—This is the most frequent form of extra-uterine pregnancy, and properly comprises the forms described as "interstitial," "tubo-ovarian," and "tubo-abdominal." The cause of this anomaly is many times found in catarrhal affections of the tubes, involving a loss of the ciliated epithelium which covers the mucous membrane, and doubtless more or less tumefaction, with consequent reduction of the calibre of the canal. In other cases the ovum is arrested in its progress by flexions and constrictions, resulting from adhesions and inflammatory bands. In rare instances it is due to the existence of small polypi.

In a number of surprising cases the corpus luteum has been

found in the ovary upon the opposite side from that suffering from the abnormal development, showing that the ovum must have migrated from one side to the other, or that its vitality under certain conditions is preserved for a longer period than is generally supposed.

After arrest, the chorion soon begins to develop villi, which engraft themselves into the mucous membrane of the tube, and serve as anchors to the ovum, and channels for supply of its necessary nutriment. The mucous membrane becomes hypertrophied, very much like that of the uterine cavity in normal pregnancy, so that a sort of pseudo-decidua results. The



FIG. 101.—Tubal Pregnancy.

peculiar characters of the mucous lining of the tube afford for the ovum but a feeble hold, and hence hemorrhage, from separation of villi, is easily brought on. If early rupture does not take place, a spurious placenta may develop, which resembles the normal placenta in some particulars, and the rudimentary villi of which are sometimes surrounded by maternal vessels of some size. The muscular coat of the tube soon becomes hypertrophied, and, as the size of the ovum increases, the fibers are separated so that the ovum protrudes between them at certain points, and is there covered by the stretched and attenuated mucous and peritoneal coats of the tube.

Rupture of the attenuated walls of the tube occurs most frequently during the fourth month, and the fœtus is cast into

the peritoneal cavity. The attachments to the tube are so frail that the ovum has been known to escape unbroken, while again the tube has given way, but the ovum has pushed but partly through the opening. Death usually follows rupture, either immediately from acute internal hemorrhage, or secondarily from peritonitis.

When maternal death does not speedily ensue after rupture, false membranes are often formed about the fœtus, or the entire ovum, and it thus becomes encysted.

The tube may rupture at a point where it is not covered by



Fig. 102.—Tubal Pregnancy.

peritoneum, in which case there is escape of the ovum and effusion of blood between the folds of the broad ligament. This form, first described by Dezeimeris, is known as extra-peritoneal pregnancy.

In extremely rare instances, tubal pregnancy, owing to excessive thickness of the muscular walls, goes on to full term.

Pregnancy in a rudimentary Horn of the Uterus.—This variety of ectopic pregnancy is probably not so rare as has been generally supposed; but since it cannot be differentiated from tubal pregnancy during life, and inasmuch as it subjects the woman to about the same dangers, it deserves in a work of this scope no extended consideration.

RARER VARIETIES.—Among the rarer varieties is that in which the placenta is in a normal situation within the uterine cavity, and the fœtus within the Fallopian tube. In another form the fœtus is found in the abdominal cavity, and the placenta in the uterus, the two being connected by an umbilical cord running through the oviduct. The latter variety of cases has been called the *utero-tubo-abdominal.* Another rare form is known as the *sub-peritoneo-pelvic*, in which the ovum, from failure or inability to get within the tube, slips between the folds of the broad ligament, and there develops.

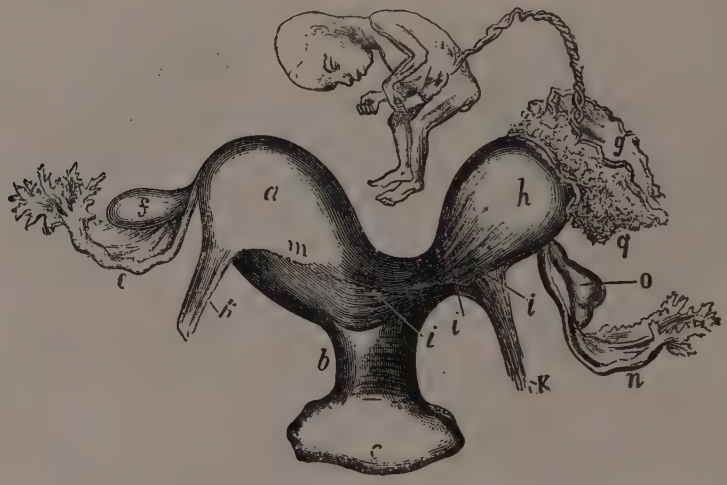


FIG. 103.—Pregnancy in rudimentary Horn of the Uterus. *a*, developed horn. *h*, rudimentary horn. *g*, rupture. *f*, right ovary. *o*, left ovary. *m*, peritoneal limit.

Uterine Changes in Extra-uterine Pregnancy.—During the development of the fœtus outside the uterus, changes, more or less marked, have been observed in that organ. They are substantially those accompanying normal pregnancy in its early weeks, and consist chiefly in increased vascularity, in marked increase in size, and in the characteristic thickening and hypertrophy of the mucous membrane.

A true decidua is formed quite like that of early pregnancy, which is subsequently cast off, though sometimes in fragments.

The cervix softens slightly, but the internal os does not yield. These symptoms are of limited development, since the stimulus essential to their continuance, such as is supplied by

entrance and implantation of the fecundated ovum, is wanting. Its bulk and vascularity are soon restored to nearly the normal standard.

The uterus is more or less displaced by the extra-uterine growth, so that the cervix, instead of being found far back in the pelvis, as it commonly is in normal pregnancy, is pushed forwards. Still the uterus is more elevated than in the early weeks of a normal pregnancy.

Symptoms of Extra-uterine Pregnancy.—In the early part of such a state there are few, if any, symptoms which differ materially from those attending normal pregnancy. The woman may enjoy health, unsettled only by gastric disturbances so common in gestation. Menstruation is interrupted in only about fifty per cent. of the cases, though it is finally suppressed in most instances, where the condition is not brought to a close by rupture of the sac. There is usually an irregular sanguinolent discharge, which may take the place of regular menstruation. The woman commonly complains of severe abdominal pain, mostly constant, but sometimes intermittent, within a circumscribed area. This pain is more likely to accompany the discharges just mentioned. Often previous to rupture, in addition to other sufferings, the woman experiences uterine pain of a bearing character. In other cases there is very little to attract attention to the case until the moment of rupture. When rupture does not occur, as the ovum increases in size, some discomfort may arise from pressure exerted by the tumor against other structures. Changes in the breasts and morning sickness are of common occurrence. After a time the enlargement attains greater size, resembling the gravid uterus, but situated a little to one side of the median line. Quickening and the fœtal heart-sounds are soon discovered.

Termination.—M. Dezeimeris, who has written a memoir on this subject, states that rupture takes place in more than three-fourths of all cases. In tubo-uterine pregnancy, it occurs, in the main, before the close of the second month; in tubal, in the fourth month; in ovarian pregnancy, later, and in abdominal pregnancy, it may continue for an indefinite period. The most common termination then, by far, is rupture—rupture of the fœtal membranes alone in abdominal pregnancy, and of both sac and membranes in other forms.

The duration of the different varieties of extra-uterine pregnancy is shown by the following tables, taken from Charpentier.

In nineteen cases of interstitial pregnancy,

Gestation lasted 4 weeks in one case.
" " about 3 months in 2 cases.
" " 3 months in 12 cases.
" " 4 months in 3 cases.
" " 5 months in 1 case.

In eighty-eight cases of tubal pregnancy,

Gestation lasted 4 to 5 weeks in 3 cases.
" " 4 to 6 weeks in 17 cases.
" " 6 to 7 weeks in 9 cases.
" " 6 to 8 weeks in 13 cases.
" " 2 months in 4 cases.
" " 3 months in 17 cases.
" " 4 months in 11 cases.
" " 5 months in 4 cases.
" " 6 months in 2 cases.
" " 7 months in 2 cases.
" " 9 months in 6 cases.

In thirty-nine cases of ovarian pregnancy,

Gestation lasted 3 to 8 weeks in 5 cases.
" " 2 months in 4 cases.
" " 3 months in 8 cases.
" " 4 months in 7 cases.
" " 5 months in 3 cases.
" " 6 months in 5 cases.
" " 7 months in 3 cases.
" " 9 months in 4 cases.

Rupture is often preceded by the bearing pains alluded to, which may continue for hours. These suddenly cease; the tumor diminishes in size; and then follow yawning, languor, fainting, clammy perspiration, rapid pulse, vomiting, collapse, and occasionally acute mania. These symptoms are succeeded by death, or, the bleeding being arrested, the woman rallies and escapes immediate danger. Still, death may follow at an interval of some days, purely as the result of hemorrhage. A moderate proportion of cases survive these perils, and the fœtus remains, perhaps for years, without bringing about fatal results.

When fœtal death spontaneously occurs or is brought about by artificial means previous to rupture, the ovum in the early weeks will be almost wholly removed by absorption, while at a later period it may undergo a degenerative process by means of which it is converted into a mole, or a lithopædion. Inflammatory action may ensue, followed by suppuration, with

ulceration into the hollow viscera or the peritoneal cavity. The immediate dangers of rupture are succeeded by others equally grave. As a result of rupture, severe peritoneal inflammation follows. Should the natural powers withstand this forcible onset, the results of the inflammation may be accounted favorable, inasmuch as pseudo-membranes are formed from coagulable lymph, which exercise a conservative influence by shutting off the ovum from the peritoneal cavity. In case rupture is not followed by peritonitis, and embryonic life is preserved, as development proceeds the movements of the fœtus within its membranes often give rise to most intense suffering. In a certain proportion of cases, the fœtus dies early, a suppurative inflammation in the sac is set up, and death results from general peritonitis, or from profuse suppuration. Should the woman survive, in consequence of low intensity and meagre extent of the action, fistulous openings to other hollow viscera may be formed, through which the sac contents will gradually be eliminated. Such an opening is extremely liable to make its way into the large intestine, sometimes through the abdominal walls, and rarely into the vagina or the bladder. At best, the process of elimination is extremely slow. For weeks or months, portions of the more indestructible fœtal structures, such as bones and teeth, are discharged. During this discharge of dèbris the inflaminatory action in the cyst goes on, and is probably intensified by the admission of air, or the contents of the viscera with which the sac communicates. Irritative fever supervenes, and death from exhaustion or blood poisoning is a common result.

"If pregnancy goes on without accident or hindrance till the close of the period which ordinarily marks utero-gestation, pains come on, which are periodic, and which are described by women who have undergone normal labor as precisely similar to those attending that progress. 'These pains,' says Burns, 'usually begin in the sac, and then the uterus is excited to contract and discharge any fluid it contains.' This uterine effort at the close of the ninth month is a physiological fact of surpassing interest."

Diagnosis.—In the diagnosis of extra-uterine pregnancy, there are three points to be established: 1. The existence of the common signs of pregnancy; 2. The emptiness of the uterine cavity; and 3. The presence of a tumor in close contiguity to the uterus. Diagnosis is attended with much difficulty,

and the best practitioners have been deceived; and yet expert gynecologists and obstetricians now make few mistakes.

The diagnosis of ectopic pregnancy, especially of the tubal variety, is a matter of great and increasing importance, since modern surgery has made it possible, in a constantly increasing ratio of cases, to avert the otherwise almost certain death which awaits the patient. But the symptoms are obscure, and in only a small percentage of cases are suspicions aroused concerning the normal character of the pregnancy, till rupture suddenly occurs. The existence of an irregular hemorrhagic discharge, appearing after the eighth week, is of some significance; also the paroxysmal cramp-like pains, radiating from the iliac fossa, which are often attributed by the woman to flatulent distension of the intestines, and thus escape critical notice. If then we meet a case presenting the signs of early pregnancy, in which the foregoing symptoms are superadded, our suspicions would justify a demand for a careful examination, when the real nature of the case may be discovered.

A vaginal examination made at such a time would reveal the uterus somewhat enlarged, its cervix slightly softened, and the existence of a para-uterine tumor. When situated low, the use of conjoint manipulation will enable one to make out the form, and feel the fluctuation of the sac. In the absence of peritoneal adhesions, *ballottement* of the entire tumor can sometimes successfully be practiced. *Ballottement* of the fœtus is practicable by the end of the fourth month. There are various conditions which give rise to physical signs of a similar kind, such as small ovarian and fibroid tumors, or even hematocele, and hence the difficulty of differential diagnosis.*

The development of symptoms which point to possible extra-uterine pregnancy in a woman after long cessation of fruitfulness, is peculiarly suggestive.

Dr. E. H. Grandin has contributed an important consideration with respect to the diagnosis of advanced ectopic gestation, namely, the absence of Hick's valuable sign of normal gravidity,—intermittent uterine contractions.

In view of the desirability of early recognition of extra-uterine pregnancy, it is justifiable, when the other evidence in

*A curious example of the difficulties of diagnosis is recorded by Joulin, in which Huguier, and six or seven of the most skilled obstetricians of Paris, agreed on the existence of extra-uterine pregnancy, and had, in consultation, sanctioned an operation, when the case terminated by abortion, and proved to be a natural pregnancy.

favor of the condition is strong, to pass the uterine sound to demonstrate the absence of intra-uterine development.

When rupture of the sac occurs early in pregnancy, the flow of blood may be moderate, and the physical signs only those of ordinary hematocele. Later rupture gives rise to symptoms of extensive internal hemorrhage, and presents a ghastly percentage of deaths.

In abdominal pregnancy the form of the abdomen will be observed to differ from that of normal gestation, enlargement being more in the transverse direction. In the latter months the form of the fœtus can be felt with remarkable distinctness. The cervix is somewhat softened, but often displaced, and sometimes fixed by perimetritic adhesions. Conjoint touch may enable the examiner separately to distinguish the uterus from the bulk of the tumor, and demonstrate its nearly normal non-pregnant size.

When extra-uterine pregnancy goes beyond the fourth month without occurrence of rupture, whether originally tubal or not, with rare exceptions, either an ovarian or abdominal pregnancy should be assumed to exist.

As a final mode of examination in doubtful cases, the woman should be anæsthetized, and deep and thorough bimanual manipulation resorted to. Under such conditions the finger will be passed into the uterine cavity, into the rectum or into the bladder, the risk being assumed by the physician, of its proving to be a case of uterine pregnancy with consequent miscarriage.

Treatment.—The mode of treatment will be determined largely by the degree of development which has been attained, the condition of the fœtus, and the health of the woman. For the sake of perspicuity and convenience, we make three classes of cases, namely: 1. Those which have not advanced beyond the limits of a few weeks; 2. Those wherein gestation is well advanced, and the fœtus is still living; 3. Those in which pregnancy has been prolonged after fœtal death.

1. Cases of Recent Impregnation.—It has been observed that, when from any cause embryonic life is destroyed, recovery often ensues. Following this hint, it has been proposed as a mode of treatment to adopt measures which will compass such a result. This has been done in some cases with good results, the methods employed being puncture of the sac, injections of morphia and other solutions, and the electric current.

Destruction of fœtal life is advisable below the age of four months, up to which time nature is probably capable of absorbing the product of conception, or at least rendering it harmless; but when greater age has been attained such a result can scarcely be expected, though Dr. Ely Van de Walker reports a case in which a five-months fœtus was absorbed within three weeks after having been killed by electricity.

Puncture of the sac, as recommended by Scanzoni, is generally effected by introducing an exploring needle, a trocar or an aspirator needle, through either the vaginal or rectal wall, and drawing off the liquor amnii. The results of this mode of treatment have not been wholly satisfactory, and fatal effects have several times been produced. In most of the cases, if not in all of them, however, an ordinary trocar was employed, which necessarily admitted air. We can hardly believe that a small aspirator needle used with antiseptic precaution, could produce serious results. Numerous instances of recovery have been put on record.

Injections into the Sac.—Joulin was the originator of this method, and he proposed injections of sulphate of atropia. Friedrich afterward followed the suggestion with success; but morphia was subsequently employed by him with more satisfactory results. Koeberle was also successful with injections. The site of puncture is the abdominal or the vaginal walls. When the needle has once entered the sac, a few drops of the liquor amnii are withdrawn and their place supplied by the solution of morphia. The operation should be repeated every second day, until evidences of success are discernible.

Electricity.—To Paul Dubois is due the honor of originating the treatment of early ectopic pregnancy by means of electricity. It was first employed in this country by Dr. Joshua G. Allen in 1869, and within a few years it has become essentially the American method.

Out of ninety-seven cases of extra-uterine pregnancy reported during the last three years, twenty were treated by electricity, with only two deaths, and those not justly attributable directly to the treatment.

The operation consists in passing the electric current through the ovum, and thereby destroying its vitality. The faradic current is the one commonly used, the full strength of one cell continued for a few minutes, at intervals of twenty-four hours, for several days, will accomplish the purpose. One pole of the

battery should be placed in the rectum, against the tumor, and the other upon the abdomen directly over it, so as to bring them as near the ovum as possible.

Evidence of embryonic death is found in diminished tension, and, ultimately, in shrinkage of the cyst.

This form of treatment ought not to be adopted in pregnancy which has exceeded four months.

Laparotomy.—Tate, Martin, Edis, Jarvin and others advocate this operation instead of attempts at embryonic destruction, and show excellent results. Still we decidedly favor the distinctively American operation by electricity, believing it best conserves the patient's interests, though less radical and brilliant.

Treatment After Rupture.—When rupture of the sac takes place, treatment should have for its primary object arrest of internal hemorrhage, and removal of the effects of shock. If the vital forces of the woman are not too low, an ice-bag may be applied to the abdomen. Very hot applications will answer better in case great depression exists. Compression of the aorta, and a sand-bag upon the abdomen over the site of the ovum, have also been recommended. The patient should be placed in a cool, quiet place, stimulants in small quantities administered as often as required, and, in the absence of other special indications, *china* given. It will be well to follow with several doses of *aconite*, in anticipation of the peritoneal inflammation which is so likely to ensue.

Twenty-two years ago, Dr. Stephen Rogers, of New York city, recommended laparotomy for the control of hemorrhage caused by rupture of the sac in extra-uterine pregnancy. Some time afterwards, Veit, of Berlin, performed it. In January, 1883, Lawson Tait operated under these circumstances, and during that and the succeeding year he added four cases. The lives of four out of these five women were saved. Dr. Charles K. Briddon operated in October 1883, and has subsequently done so a number of times. During the past few years Tait has operated on about twoscore cases, with almost uniform success. In view of the recent great improvements in abdominal surgery, it has come to be the duty of the obstetric surgeon thus to deal with these cases which formerly resulted so disastrously.

There is some question concerning the proper time for operative interference. In most of Tait's cases the operation was performed some hours after the development of symptoms indi-

cating rupture of the sac. The condition immediately following rupture is essentially one of collapse, and therefore one decidedly inimical to a serious operation like the one in question. It follows, then, that the first indication is to control hemorrhage by indirect means, if possible, and excite reaction, as hereinbefore stated. If such efforts prove unavailing, long delay would be inadvisable.

The operation consists in the usual abdominal incision, control of the hemorrhage, if it still continues, by ligature or compression, and in removal of the débris. The peritoneal cavity should be carefully washed out and the abdominal wall closed in due form. Something more than this is occasionally required. In case of interstitial pregnancy, oozing may continue in spite of every expedient, and hysterectomy be required. In other cases it may be necessary to remove the uterine appendages upon the side involved.

2. CASES OF ADVANCED GESTATION, THE FŒTUS STILL LIVING.—Most women suffer during the progress of such an abnormal gestation from attacks of circumscribed peritonitis, from great sensitiveness to fœtal movements, from recurring uterine hemorrhages, from emaciation and from depression of the vital powers. With the occurrence of labor-like efforts, peritonitis is apt to be relighted. Considering all the dangers to which both woman and child are exposed under the expectant plan of treatment, it has been proposed that an early operation be performed, with a view to rescuing the latter from certain death, without materially increasing the risks sustained by the former. But the results of such operations have been of a disheartening nature, the chief source of danger being found in the hemorrhage which necessarily follows removal of the placenta. On the other hand, when the placenta is permitted to remain, septic poisoning and fatal hemorrhage are liable to occur during the process of elimination. The difficulties are made still more formidable by the situation of the placenta, in a considerable percentage of cases, on the line of incision. The operation has been performed but a few times in this country.

OPERATION THROUGH THE VAGINA.—From thirty-three cases Dr. Herman draws the following conclusions: 1. The operation of opening an extra-uterine gestation sac by the vagina early in pregnancy, before rupture has taken place, by the cautery, knife, or otherwise, is a dangerous proceeding. Abdominal section ought always to be preferred. 2. Soon after rupture has

taken place, when interference is called for to arrest hemorrhage, abdominal section is more likely to succeed than vaginal. 3. When rupture has taken place, and the effusion of blood is followed by pyrexia, the indications for incision of vagina are the same as those in hematocele from any other cause. 4. At, or soon after, full term, before suppuration has taken place, there may be conditions which indicate delivery by the vagina as preferable to abdominal section. These are, 5, when the fœtus is presenting by the head, breech, or feet, so that it can be extracted without altering its position, and, 6, when it is quite certain, from the thinness of the structures separating the presenting part from the vaginal canal, that the placenta is not implanted on this part of the sac, and it is not certain that the placenta is not implanted on the anterior abdominal wall. 7. If the child cannot be delivered by the vagina without being turned, abdominal section should be performed. 8. No attempt should be made to remove the placenta. 9. The after-treatment should consist in frequent washing out of the sac. 10. After suppuration has taken place, the spontaneous opening of the sac into the vagina is one of its more favorable terminations.

3. CASES OF GESTATION PROLONGED AFTER DEATH OF THE FŒTUS.—When the fœtus is dead, no attempt should be made to remove the product of conception during the existence of labor pains, as the dangers would be thereby unnecessarily enhanced. It is generally thought advisable to wait, carefully watching the patient, until the symptoms become grave, or there is positive indication of the channel through which elimination of the fœtus is about to take place. If relief is to be found through the vagina, it will be shown by bulging of the cyst in or about this organ. An opening may be effected by the natural efforts; in which case it ought to be artificially enlarged to a size which will admit of fœtal exit. Should the opening be into the intestines, the dangers and difficulties attendant on expulsion become so great that laparotomy would be justifiable.

It is obvious that the presence of a dead fœtus seriously compromises the safety of the woman, and the suppurative process which is liable to ensue, inevitably reduces her to a deplorable condition. In view, then, of the success which has attended secondary laparotomy, on one hand, and the extreme dangers of waiting, on the other, operative interference seems to be a justifiable procedure. Out of thirty-three cases collected by Litz-

mann, twenty-four of which were between 1870 and 1880, there were nineteen recoveries. It will be observed that the two great dangers which attend the primary operation (that made during fœtal life)—hemorrhage and septicæmia—are in this operation greatly modified, the former by gradual thrombosis and obliteration of the maternal vessels which follow cessation of the fœtal circulation, and the latter by the possibility here afforded for the removal of the entire ovum, or the speedy subsequent separation and extraction of the placenta.

The following figures, furnished by Deschamps, showing the common termination of cases left to nature, and the results of interference, are among the most recent:

In 11 cases	formation of lithopædion or encystment.			
" 19 cases	opening into	rectum	with	8 deaths.
" 3 cases	"	into vagina	"	1 death.
" 1 case	"	into uterus	"	1 death.
" 5 cases	"	at umbilicus	"	0 death.
" 18 cases	secondary laparotomy		"	4 deaths.

With respect to the time for the performance of secondary laparotomy, a clear notion is of much importance. The time of fœtal death should be carefully noted, and our object should be to delay a sufficient length of time to provide for obliteration of the placental vessels. Schroeder removed the placenta without loss of blood three weeks after cessation of fœtal movements. De Paul operated four months after fœtal death, and lost his patient from placental hemorrhage. There is no doubt that the process of obliteration of the placental vessels is rapidly effected in some, and slowly in others; hence, under the circumstances, unless interference be urgently demanded, it is advisable to postpone operative measures, and treat the patient symptomatically.

The woman should receive an abundance of fresh air and nourishing food, while in the absence of more specific indications *arsenicum* ought to be administered. Should marked septic symptoms be developed, they ought to be regarded as a signal for interference, since delay would almost certainly be fatal.

The operation itself should begin with an incision along the linea alba, as in other cases. If no adhesions are found between the cyst and surrounding structures, the former can be turned out through the incision, before rupture, and stitched to the cut borders of the abdominal wall. The placenta, unless it occupies the site of the incision, or unless it separates at once

spontaneously, should be permitted to remain. The cord should be placed in the lower part of the wound, which will be left open for its reception and for drainage.

Missed Labor.—"An extremely rare and curious phenomenon has been occasionally observed, in which, the fœtus remaining in utero, labor has not come on at the usual time, and the remains of the fœtus may be retained for a considerable period, or discharged piecemeal by the vagina, without, for a time at least, seriously affecting the health of the mother." This has been called "missed labor."

Muller, after investigating forty-five cases of alleged missed labor, concluded that there does not exist an authentic observation of retention of the fœtus within the womb beyond the term of ordinary pregnancy. By many they are regarded as instances of extra-uterine pregnancy.

For the most part, death of the fœtus is followed either by premature expulsion, very soon after life is extinct, or by the occurrence of abnormal development of the fœtal envelopes, and a perversion of the natural energies, culminating in molar pregnancy. In the rare cases above alluded to, neither of these occurrences is observed, but the fœtus becomes mummified, or disintegrated, and its remains are retained in utero for months, or even years. The cause of this is supposed to be absence of uterine irritability, obstructed labor, and unusually close adhesions of the placenta. In many cases uterine expulsive action is set up, but, after a time, it ceases permanently, or is renewed at intervals, for days, weeks, or even months. Whenever the ovum perishes and is kept in the womb for a time far in excess of the period of normal utero-gestation, whether molar changes take place, the fœtus is disintegrated and discharged piecemeal, or becomes mummified; indeed, whether any decided post-mortem changes take place or not, they constitute an instance of what has been known as "missed labor." Manget reports an observation by Langelott of a case in which the fœtus perished in the fifth month, and was not expelled until the twelfth month, in a mummified condition. Johns observed two cases in which the fœtuses died at the sixth month, and were not born till five and six months respectively after their death. Olshausen reports a case of retention of a mummified three-months fœtus for eight-and-a-half months. McMahon relates a case in which a fœtus of four months was retained for eighteen months, and was then expelled, inclosed in a compressed placenta which

evidently had continued growing for some time after fœtal death. The calcified or mummified fœtus is said to have been retained many years. Fœtal bones have been discharged from the uterus where they had been incrusted for years.

Dr. Stanley P. Warren relates a case of missed labor resulting from rigidity of the os uteri in which delivery was finally effected through Cæsarean section.

A. Halley and H. Davis report the case of a woman who, in the second half of her pregnancy, had a brownish discharge from the vagina, and occasionally lost putrid fleshy masses, at times accompanied with bones. Four years later the os uteri was artificially dilated, and eighty-six bones removed in two sittings. In rare cases of prolonged retention, the fœtus becomes the seat of fatty and calcareous degeneration, in which case it is designated by the term "lithopædion." The subject of missed abortion is considered in another place.

Treatment.—When a woman has presented undoubted signs of pregnancy, has passed by the period of mature gestation, and evinces indications of fœtal death, followed by disintegration or mummification, it is clear that something ought to be done to effectually rid the system of the depressing influences to which it is subjected. This can be done only by securing thorough uterine evacuation.

We should begin by seeking a remedy which covers the symptoms. It will probably be found among the antipsorics, and is likely to be *sulphur, calcarea carb., silicia,* or *arsenicum.* If the carefully chosen remedies fail, we may afford relief by mechanical and manual means, but it should not be undertaken unless the condition is seriously disturbing the health. But if active interference be required, the lower numbers of a set of graduated steel dilators may at first be used, and when sufficient dilatation has been secured to admit of its easy introduction we may employ Allen's dilator, and finally a Barnes' bag, further to expand the os. When it has thus been opened, the operator should proceed much as he would in abortion, relying mainly on the placenta forceps or small blunt hook, and finally the curette, as a means of complete delivery. If putrid masses be taken away, the uterus, after complete evacuation, should be washed out with a mild antiseptic solution. This operation, like all others, ought to be performed throughout under antiseptic precautions, and followed with a few doses of *arnica.*

CHAPTER VIII.

PREMATURE EXPULSION OF THE OVUM.

Premature expulsion of the product of conception may take place at any moment prior to the time when the fœtus presents all the evidences of maturity, and the process has received different designations according to the stage of pregnancy at which it occurs. Interruption of pregnancy during the first three lunar months is termed *abortion;* during the fourth, fifth, sixth and seventh months, that is, from the time when the placenta is fully formed to the date of viability, it is called *miscarriage;* and from that time to the close of the thirty-eighth week it is known as *premature labor.* While these are the technical distinctions, the terms abortion and miscarriage are used interchangeably by many, and, as we believe, with perfect propriety.

The term fœtus, according to usage, is not applicable to the product of conception until the termination of the third month of gestation. Till then it is known as the embryo.

The liability to premature expulsion is doubtless greater in the early weeks of gestation, when the union between the chorion and decidua is imperfect, as hemorrhage is apt to occur and fill the space between them, thereby cutting off communication between the mother and child.

Obstetrical writers do not agree as to the relative frequency of abortion. Hegar reckoned one abortion to every eight or ten full-time deliveries, while Devilliers sets them down in the proportion of one to three or four. The statistics of Whitehead show a proportion of about one to seven. Probably thirty-seven out of every hundred mothers experience abortion before they attain the age of thirty years.

Causes of Abortion.—The causes of abortion, miscarriage and premature labor, are, in the main, of slow, but cumulative action. The uterus is a patient organ. It will bear a good deal of abuse, neglect and interference, and with the greatest reluctance does it finally exhibit resentment. It is the mother organ, and in the quiet forbearance and self-sacrificing devotion to the new being which it nourishes, it is a reflection of the maternal mind. Evil influences set themselves at work and gradually undermine the vitality of the ovular structures

and render insecure the placental attachments to a degree which finally enables a very little accident to precipitate expulsion.

As long as there is life in the inchoate being so carefully wrapped up in the membranes, the uterus holds on with surprising tenacity; but when that is from any cause extinguished, the enveloping organ begins to gather force with which to effect its expulsion. These are the phenomena most commonly observed; but in a certain percentage of cases, the uterus is excited to expulsive effort before fœtal death occurs.

PREDISPOSING CAUSES.—Death of the fœtus is sometimes the result of direct or indirect violence; but it is oftener due to slow pathological changes in the embryonic or the maternal structures directly concerned in nutrition.

When death overtakes the embryo or fœtus, it at once becomes a foreign body, and with conservative sense the womb sets at work to bring about complete evacuation. The villi of the chorion in early pregnancy, and of the placenta at a later period, undergo atrophy and fatty degeneration, and when the ovum is thus loosened from its moorings, uterine contractions are set up and expulsion is accomplished.

A small embryo, if long retained, may become disintegrated in the amniotic fluid, and thus disappear.

In early abortion the sac frequently comes away intact; but at a later period it rarely does.

OVULARY CAUSES.—These include the various diseases and accidents affecting the fœtus and its envelopes, details of which need not here be given.

MATERNAL CAUSES.—Abortion often finds its predisposing causes in morbid conditions of the deciduæ. Among these are (1) atrophy, and (2) hypertrophy of the uterine mucous membrane.

The endometrium, instead of affording a generous reception to the impregnated ovum, and snugly enclosing it, in some cases spreads an abnormally thin decidua, with the result, a small placenta. In other cases the decidua reflexa is not completed, or may utterly fail of development; in which case, covered only by the chorion, the ovum is suspended from the serotina.

In either case, the ovum, instead of being at once expelled by the uterine contractions, may be forced downwards to the cervix, and there remain for a time nourished by the pedicle

which it forms. This has received the name of cervical pregnancy. It is chiefly the rigidity of the os internum and the cervix which retains the ovum, and hence it is an occurrence more common in primiparæ than in multiparæ. In some instances, however, the strength of the pedicle is sufficient to prevent further descent, even when the os is patulous.

Endometritis with consequent thickening of the mucous membrane is a frequent cause of abortion, from the fact that it gives rise to structural changes in the placenta. A placenta thus involved may fail to supply to the fœtus requisite nourishment, or the weakened vessels of the decidua may rupture and produce sanguineous effusion between the membranes.

In retroversion, which is recognized as a common cause of abortion, the endometritis is probably the chief factor in bringing about the untoward result.

Interstitial and submucous fibroids, by preventing equable development of the uterine walls, and by encroaching on the uterine cavity, may be the means of exciting expulsive action.

The results of former cellular or peritoneal inflammation may prove seriously inimical to continued gestation, through the irritation caused by adhesive bands and thickened parauterine structures.



FIG. 104.—Ovum with imperfectly developed Decidua Reflexa.

It is customary to place syphilis at the head of causes of premature fœtal death, and after it follow pernicious anæmia, chronic metritis, and endometritis. Dr. Fehling has shown that this result very frequently results from kidney diseases of the pregnant woman. In all the cases referred to, albuminuria occurred, partly as the result of parenchymatous nephritis and partly as the result of a genuine contraction of the kidneys. After death of the fœtus the albuminuria increased rapidly. In the placenta may be observed deposits due to infarction, so-called fibrinous wedges, the result of an ischemic necrosis.

Acute diseases, especially those creating high temperatures, are liable to result in abortion.

Napier lays emphasis on neuralgia as a predisposing cause. Following are his conclusions:

1. Neuralgia and abortion are frequently associated.

2. In certain cases of "habitual abortion," neuralgia invariably manifests itself as the first symptom, attacking cranial or spinal nerves remote from the uterus.

3. If treatment relieves the pain there is a strong probability that uterine disturbance will not commence, or, if already there have been contractions, these will cease.

4. Neuralgia, while perhaps most common in the rheumatic, occurs in different types of patients: in the anæmic, dyspeptic, or malnourished; or in the overfed, indolent and plethoric.

5. Abortion sometimes evidently results from the reflex irritation associated with the neuralgic pain.

6. Acute neuralgias occurring in pregnancy may not in any way interrupt healthy gestation.

7. When severe facial, cervical, or other neuralgia yields to treatment, even though the embryo be dead, uterine contractions and emptying will not occur for days, perhaps weeks.

8. The trifacial, occipital, and cervical nerves are most commonly affected; but brachial, intercostal, lumbar, and sciatic neuralgias are also met with.

9. Acute gastric irritation is associated with neuralgia and abortion. Pregnancy sickness, although very severe, seldom causes miscarriage; but gastrodynia, which is sometimes accompanied by salivation and a constant feeling of nausea and depression, not infrequently precedes acute neuralgia, which eventually causes uterine irritation and ends in abortion.

In many cases it is impossible to trace the cause of the occurrence to any abnormal conditions of either the fœtus and its envelopes, or the maternal generative organs. In such women there doubtless exists a condition of nerve irritability, which readily reflects irritation proceeding from physical or psychical sources, with force sufficient to produce powerful premature uterine action.

IMMEDIATE CAUSES OF ABORTION.—The immediate causes of abortion arise in general from the maternal side. No changes on the part of the ovum, save those of forcible separation of the attachments, or rupture of the membranes, could bring

about the result. The maternal influence, however, is strong and unmistakable, and is often exerted, willingly or unwillingly, with the effect to interrupt pregnancy.

Uterine Congestion.—Active or passive congestions of the uterus are probably the most frequent proximate causes of abortion. In those cases wherein influences have been silently at work to weaken the relations between the ovum and decidua, any circumstance which is capable of determining an unusual quantity of blood to the organ is capable of causing extravasation, separation, and premature expulsion. Hyperæmia excited by an accomplishment of the menstrual cycle, fevers, inflammation of the genitalia, excesses in coitus, hot foot-baths, the use of certain drugs, unusual physical exertion, valvular heart-lesions, obstructions of the pulmonary or portal circulation, may be the means of precipitating expulsive action. Under conditions of uterine hyperæmia, a very slight motion or jar, vomiting, coughing and straining, to say nothing of falls, injuries, and violent emotions, are capable of hastening the fall of the unripe fruit of the womb.

The significance of pre-existing remote causes, associated with accidental occurrences, is clearly shown in many recorded cases. When the connections between decidua and ovum have not been weakened by the occurrence of any of the changes before mentioned; in other words, when the woman in all her generative tissues is in a healthy state, most powerful influences of a baneful nature are often suffered, without interruption of a normal course of gestation. Falls from considerable heights, giving rise to severe contusions and fractures, have repeatedly occurred to pregnant women without causing abortion. Dr. Pagan tells of an instance in which his coachman drove directly over a woman who was in the eighth month of pregnancy, inflicting upon her serious injuries, and still gestation proceeded in a regular manner to term, and terminated in the birth of a healthy child. M. Gendrin speaks of a young lady who was thrown from a chaise over the horse's head, by the animal falling in his career. The lady was then five months pregnant, but the accident did not prevent her from reaching her full term. Cazeaux met a case precisely similar in the wife of a notary living near Paris. Women, with a desire to rid themselves of a developing ovum, sometimes resort to most desperate measures without success.

Matthews Duncan mentions a case wherein an intra-uterine

stem pessary was introduced and worn for some time during pregnancy, without exciting miscarriage. A woman seven months pregnant jumped from a third-story window to the pavement below without suffering abortion, though she broke both her legs and arms. Operations of all degrees of severity have been performed with immunity from the result in question. Limbs have been amputated, ovaries have been removed; the vaginal portion of the cervix uteri has been cut off, and submucous fibroids have been taken away by laparotomy.

Symptoms of Abortion.—Early abortion may, and doubtless does, occur, in many cases, with symptoms differing but little from those attending a return of the monthly flow. There are pains in the sacral and hypogastric regions, and bearing sensations in the pelvis, with a rather free flow of blood, and then the whole ovum may be discharged, enveloped in a clot, thereby utterly escaping notice. In other cases the sac is ruptured by the uterine contractions, the embryo escapes unnoticed and the membranes soon follow.

In either case there is generally but a moderate loss of blood; but the rule is not without its exceptions. In a certain proportion of instances, even in the early weeks of pregnancy, the hemorrhage attendant on the occurrence is remarkably profuse, and occasionally even alarming. Still the practitioner may comfort himself and patient with the reflection that in early abortion, under intelligent management, this symptom is more alarming than dangerous, since women who are the subjects of it not only survive, but rarely suffer serious impairment of health or strength.

As soon as the ovum, whether whole or in fragments, has been completely extruded, there is usually an end to the bleeding, and but a short period of time is consumed in uterine involution. But in early, as well as later, abortion, the presence in utero of any part of the product of conception, whether it be embryo or envelopes, is apt to continue the hemorrhage. There may be temporary cessation, but the flow again returns to declare that the abortive process is incomplete.

Later abortions present more pronounced characters. The pains are more severe, the flow more profuse, and the effect on the woman more profound. For some time before these symptoms set in, prodromata are generally experienced consisting of fullness and weight in the pelvis, sacral pains, frequent micturition, and a mucus or watery discharge. These, followed by

recurrent pains and hemorrhage, indicate a threatened abortion. There may be but a slight discharge at any time during the progress of the case, but in every instance there is liability to exhausting and even dangerous hemorrhage. The peril to life from the blood loss is not great, but the baneful effects of a sanguineous depletion, such as is now liable to be suffered, are not speedily remedied. The tenor of the woman's general health may be seriously impaired for months, or even years.

In a typical case of abortion occurring about the third month, the ovum is extruded without rupture, in which case it passes into the vagina, with the embryo visible through the thin membranes, and the imperfectly formed placenta attached. The uterus, then being empty, contracts down, and the hemorrhage is at an end. In abortions occurring after the third month, it is uncommon for the ovum to come away entire; but the membranes are ruptured, the fœtus expelled, and the secundines are retained. During the period of retention, which may be prolonged, the woman is in constant danger of profuse and sudden loss of blood. After the abortive act has been finished by complete evacuation of the uterus, hemorrhage is an unusual occurrence; but in rare cases, owing to a depraved state of the system, to intra-uterine growths, or to imperfect involution, it becomes an annoying complication of the puerperal state.

INCOMPLETE ABORTION.—Retained secundines, whether in early or later abortion, are apt to prove a source of much trouble. Here, as in labor at full term, after expulsion of the fœtus the uterus is disposed to take a season of rest; but, unlike the latter, this rest is usually prolonged. We may sometimes vainly wait hours or days for renewed action, while cases are by no means rare in which vigorous uterine contractions never return.

The comparative comfort of the woman will lead her to believe that the process is complete, and a physician may not be consulted until serious symptoms are developed. Violent hemorrhage may at any time ensue, or in default of that, septicæmia may be set up. In many cases the physician does not reach his patient until the fœtus has been expelled, and the clots which generally follow are falsely assumed to be the afterbirth. The patient or friends being deceived by these, the physician is informed that everything has come away, and as all evidence has been destroyed, the confident statement of the attendants is liable to make him the dupe of credulity.

The *Diagnosis* of *Incomplete Evacuation* becomes a point of great nicety, in those cases where the extruded matters have all been preserved, as well as in those where they have not. When the ovum is discharged with its membranes intact, it is not difficult to arrive at a positive conclusion; but this does not always occur. The placenta, or decidual mass, is relatively large. The size of the embryo, at an early period, may be represented by the last phalanx of the little finger, or a Lima bean, while the afterbirth, when spread out, is as large as one-third of the hand. In some cases the secundines are expelled or extracted in fragments, and a retained portion is easily overlooked. It follows that absolute certainty can be attained only by careful exploration with the finger.

Cases are on record in which the order of expulsion was reversed. The membranes were ruptured and expelled, uterine action ceased, and the fœtus was retained. Dr. Noeggerath mentions a case in which the membranes were expelled at the fourth month of pregnancy, and the fœtus was retained for several weeks. In the interval between the expulsion of the membranes and birth of the fœtus, the woman was in a comfortable state. Dr. Chamberlain relates a case in which the membranes were expelled, but the fœtus continued in utero for twelve weeks. Dr. Peaslee had a similar case in which the fœtus tarried three months. In the last two cases the women manifested symptoms of retention of a part of the ovum, there being hemorrhage and irritative fever.

The following observations by Spiegelberg concerning incomplete abortion merit most attentive study:

1. Most frequently hemorrhage continues at intervals, spontaneous elimination gradually taking place, as through retrograde changes, portions of the retained membranes become successively loosened from their attachments to the uterus.

2. In exceptional cases the hemorrhage ceases for a time entirely. For days, weeks, and even months, the woman appears quite well, then suddenly strong contractions, accompanied by profuse hemorrhage, usher in the elimination of the fœtal dependencies.

Lusk says, in a case of his own, three months elapsed from the occurrence of the first hemorrhage, which took place towards the end of the third month, and was quite insignificant in amount, before the abortion was completed. Meanwhile, as there were progressive abdominal enlargement, supposed

quickening, and milk in the breasts, the threatened abortion was believed to have been arrested.

Total retention with a long interval of quiet is supposed to proceed from an unbroken relationship between the placenta and the uterine walls, by means of which the former, though

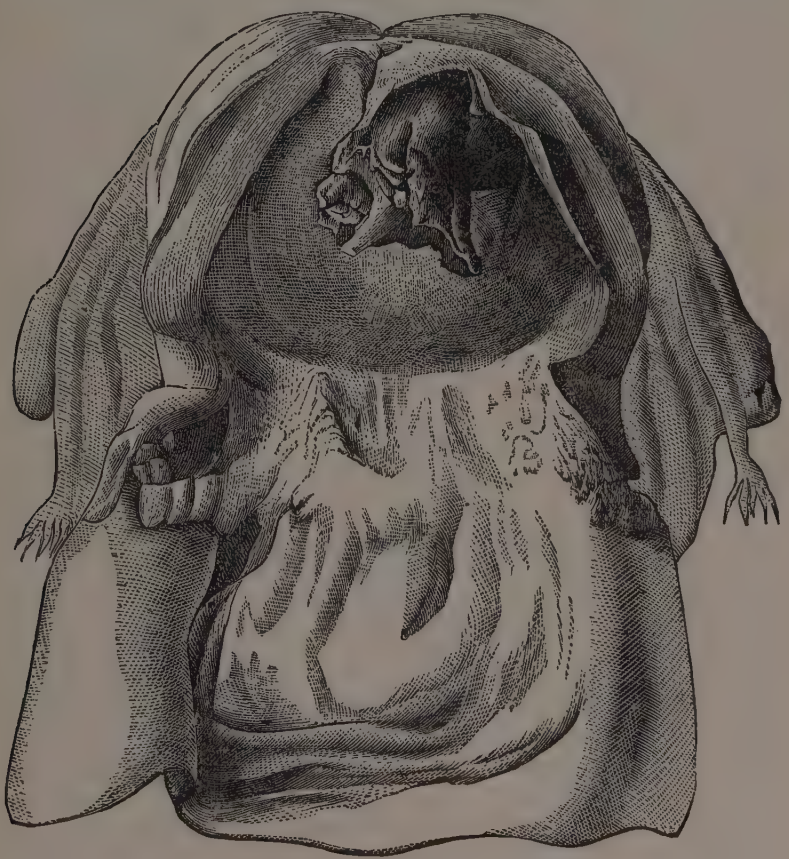


FIG. 105.—Uterus, with basis of a Fibrinous Polypus after an abortion. (Fränkel.)

functionally inactive, continues to receive nutrient supplies from the uterus. The retained secundines, if not removed by artificial means, have a strong impulse to come away at a menstrual period.

3. Of more frequent occurrence than the foregoing, is the putrid decomposition of the retained portions. It occurs chiefly in cases where there is more or less complete loss of organic

connection between the placenta and the uterus. Decomposition of the non-adherent portions is produced by the introduction of air during the escape of the embryo, or through the subsequent passage of the finger into the uterus, or where portions of the ovum hang down into the vagina, by absorption of septic matter from the vagina upwards into the uterus. As a result of putrid decomposition, the woman is exposed to septicæmia, and inflection of thrombi at the placental site. Fatal results are, however, rare, as decomposition is usually a late occurrence, setting in, as a rule, only after protective granulations have formed upon the uterine mucous membrane, and after complete closure of the uterine sinuses. Continued fever, with intercurrent attacks of hemorrhage, is, however, set up, but finally passes away with the gradual discharge of the decomposed particles, while the threatening symptoms subside. Still, now and then septic processes lead to an unfavorable termination. Local perimetritic inflammation is a common event.

4. Where there is a certain degree of relaxation with enlargement of the uterine cavity, the fibrin of the extravasated blood may become deposited about any uneven surface within the uterus, and give rise to a polyshaped body, suggestive in its mode of development of the stalactite formations in calcareous caverns. These so-called fibrinous polypi generally develop around the débris of an abortion, such as retained bits of decidua, placental remains, and portions of the fœtal membranes. In some cases, likewise, thrombi projecting from the placental site become the base of a loose fibrinous attachment. Placental polypi give rise ultimately to bearing down pains, and intercurrent hemorrhages. They may even decompose, and endanger life by septic absorption.

EXPULSION OF ONE FŒTUS IN TWIN PREGNANCY.—In twin pregnancy one ovum may be blighted and expelled, and the other retained till completion of the full term of utero-gestation. A most interesting case of this kind was reported by Dr. E. Chenery. A woman at the fifth month presented the usual symptoms of abortion, and a fœtus in its envelopes, together about the size of a common open-faced watch, was expelled. Upon making a vaginal examination the head of a much larger fœtus was found protruding through the os uteri. This was seized by the fingers for the purpose of extraction, but it escaped and returned to the uterine cavity. The physician, supposing

that expulsion was then a necessity, gave ergot, but the os contracted, and the uterus refused to act. When the full term of pregnancy was accomplished, expulsion took place in a normal manner.

Another case of similar kind was reported by Dr. Stanley P. Warren, of Portland, Maine, in 1887. Other cases are on record. In general, however, in multiple pregnancy, the uterus is entirely evacuated without a long interval of repose.

Diagnosis.—Contemplation of the symptoms of abortion as related would lead one to suppose that diagnosis of the approaching occurrence should not be attended with much difficulty. Still, in many cases this is not true. The woman, perhaps, has evinced her pregnant state by the usual symptoms, and now hemorrhage and pain indicate its threatened conclusion. The case is clear, and diagnosis unequivocal. But we often meet women who are worshiping at the shrine of the goddess Isis. So extremely desirous are they to present their husbands with heirs, that every possible sign of pregnancy has been magnified as a support to fond hopes, and the symptoms now presented, though really those of a menstrual return, are construed to be signs of abortion. There are women of opposite desires and tendencies who will minimize every true symptom, and thus mislead themselves, as well as those who are summoned to their aid. Then there are those unfortunate females, many of them girls scarcely out of their teens, who, having fallen prey to the wiles of designing men, use every endeavor to conceal the evidences of guilt. Among the number are found some to whom we would scarcely dare impute wrong-doing, and who thereby disarm suspicion. The only safe course for the physician to pursue is to insist upon an examination *per vaginam* in all cases where, from the symptoms, there appears to be the least possibility of threatened, or partially completed, abortion. The diagnosis is based upon the presence of pain, hemorrhage, dilatation of the cervix, and descent of the ovum. If the os has become patulous, the ovum may be felt, when the demonstration becomes complete. In all cases of pregnancy, the occurrence of hemorrhage, even unaccompanied by other symptoms, ought to be accepted as a probable evidence of threatened abortion, and every precaution accordingly exercised.

It is impossible to make out with certainty, from mere subjective symptoms, the existence of pathological changes in the

ovum and deciduæ which prepare the way for abortion. Death of the embryo may be inferred from the signs given in another chapter; but positive knowledge can be obtained only at a later period.

Whenever the discharged substances have been preserved, the physician should carefully examine them with a view to discovering every possible trace of the ovum. The clots may be broken up in cold water, and solid substances wholly freed from extraneous matters. The ovum, when unruptured, is generally found surrounded by layers of coagulated blood, and may easily be overlooked. If the discharged substances have not been preserved, and the os uteri will not admit the point of the finger, it may be impossible to determine at once whether complete evacuation has been effected or not. Forcible measures are not justifiable for mere diagnosis. The occurrence of further pain and hemorrhage would constitute strong evidence of retention, and dilatation of the os may be necessary as a preliminary to extraction of the remaining substances.

Prognosis.—Of prognosis as regards the fœtus, of course nothing need be said. The maternal mortality from abortion is not great, but the pernicious effects on health are very decided. More feebleness and suffering proceed from this source than from labor at term. Women frequently urge, as an objection to continuing the pregnant state, that their health is so feeble as wholly to disqualify them to endure the strain of pregnancy and labor, but assume that interruption of pregnancy will protect them from subsequent physical ailments. The minds of women ought to be disabused of such erroneous notions. The hemorrhage which usually accompanies premature expulsion of the ovum does not often destroy life, but it so reduces the strength, and hence the powers of resistance, as to create inviting subjects for the inroads of disease.

Criminal abortion is quite another thing, and if we could gather reliable statistics concerning the results of it, the mortality would be shown to be very heavy. The professional abortionist frequently makes of himself a professional executioner.

Treatment.—The treatment of abortion is: 1. Preventive; 2. Promotive; and 3. Remedial.

PREVENTIVE TREATMENT.—This involves (a) general and special prophylaxis, and (b) the arrest of threatened abortion.

The pregnant woman, and especially she who has already

suffered one miscarriage or more, should attend most scrupulously to the observance of general sanitary rules. Over-indulgence and over-exertion are particularly to be avoided. No amount of exercise should be laid out for pregnant women indiscriminately, for what may justly be regarded as moderate exercise in one case, will far exceed the endurance of another.

Women who have had repeated abortions, at or near a certain period in pregnancy, must be guarded with the greatest care.

It is sometimes advisable to put them in close quarantine, and even in bed, for a time, though no threatening symptoms have arisen. When the period at which, in individual cases, an interruption of pregnancy generally occurs, has been safely passed, the woman's restraints may be gradually relaxed, until they have been reduced to a minimum. So strong a propensity is sometimes generated by recurrent abortions, that the unexpected arrival of a friend, a visit to the table, or even a strong odor, may be sufficient to bring on the accident.

For these discouraging cases of habitual abortion we would especially recommend the following remedies:

Sulphur for women who are thin and feeble, with dry skin and poor complexion. Very sensitive to vaginal examination. Sense of weakness in genitals. They have usually menstruated sparingly.

Arsenicum iod. for scrofulous women, especially those who have, or have had, eczema. The skin is easily irritated.

Calcarea carb. is likewise suited to scrofulous subjects, especially those with fair skin, light hair and rotundity of form. They give an account of habitually profuse menstruation.

Caulophyllum when the woman has suffered from myalgia; is a poor sleeper; has a history of "female weakness."

Sepia.—We regard this as one of the best remedies for use in these cases, especially in nervous, sensitive women. Complains of much bearing towards genitals; cannot sleep well.

Kali iod., merc. iod., nitric acid, and other remedies, may be called for when there is a syphilitic taint.

The treatment of chronic and acute disease in general, of which the woman may be the subject, is also included in prophylaxis, but methods of treatment and the selection of remedies are modified so little by the patient's pregnancy as not to demand extended consideration here. The same may be said also of accidents, from which pregnant women are not exempt.

Since strong emotions, which in a non-pregnant state could do no harm, are capable of producing, during gestation, most serious consequences, they ought to receive attention. After violent anger, *colocynth* and *chamomilla* are of considerable service. When anger or vexation is associated with fright, *aconite* may be employed. It is also of service when, after fright, a state of apprehension and dread remains. *Opium* also has the reputation of effecting favorable results after fright. To avert the evil effects of grief we can probably do no better than to administer *ignatia* or *phosphoric acid.*

After a bruise a few doses of *arnica* ought not to be omitted. A strain generally excites uterine action by rupture, to a certain extent, of the utero-placental relations; still, good may occasionally be done by the timely administration of *rhus toxicodendron.*

After marked symptoms of threatened abortion have appeared, the first point to be settled is, whether the abortion ought to be, or can be, prevented. In general, the physician should firmly and conscientiously be in no way accessory to abortion, and only when he is convinced that the fœtus is dead, or that discharge is inevitable, should he assume the responsibility of promoting the act already begun, or passively permit the consummation of it. This principle of action, closely followed, gives considerable scope for the employment of preventive measures, when once the expulsive forces of the uterus have been aroused.

Little time should be lost in getting the woman into a bed, which has cool, pleasant, and quiet surroundings. Her clothing ought to be removed, and loose garments substituted, at the earliest practicable moment. If the hemorrhage is profuse, the hips may be raised by something laid directly under them, or, better still, by setting the foot of the bed upon blocks. In a certain percentage of cases, perfect repose of body and mind is the only essential, but when painful uterine action has been excited, when the hemorrhage is profuse, or when a passive flow has existed for some time, further means of prevention will be required. The similimum of the case should be sought, and if found, it may quiet the pains and arrest the flow in a magical way.

There are a few remedies which we have found of frequent service at such a time; but let us not forget that, whenever any remedy is called for by clear indications, whether its special

sphere of action is the generative, or not, it should be administered.

Sabina is a prominent remedy, especially in threatened abortions about the third month of pregnancy. The hemorrhage is rather profuse, of a bright red color, and is accompanied with clots. Its action is more prompt and efficient in nervous, hysterical women, but need not be limited to such. In the absence of clear indications for some other remedy, we do well to employ this.

Secale cor. is best suited to thin cachectic women, and to late abortions. The flow is passive and more like the menstrual discharge. The pains are not very vigorous, but rather protracted.

Caulophyllum.—The pains are spasmodic and pressive, but the flow not necessarily profuse. The woman is uneasy and sensitive. Tremulous weakness.

Pulsatilla.—Especially for mild, tearful women; but irritability of temper is sometimes a good indication. In those cases where the sudden spurts of blood are unusually profuse, with only a moderate flow in the intervals.

Viburnum.—It has been highly extolled by some. Our own experience with it has been very limited, and we are aware of no special indications for its use.

Ipecac.—When the hemorrhage is profuse, and blood bright red. It is more likely to be efficacious in women with a history of profuse menstruation.

Gratifying results are often obtained from the above remedies. To them we may add *aconite*, with its great fear of death, and of stir, or bustle; *nux moschata,* with its hysterical symptoms and syncope; *belladonna*, with its bearing-down sensation, and bright red blood, which feels hot to the parts over which it flows; *apis*, with its stinging, tearing, aching pain; and *gelsemium*, with its pains running up the back.

In old-school practice, *opium* constitutes the great reliance for the prevention of abortion in these instances where threatening symptoms have arisen, and there is no sort of doubt that it proves efficacious in many cases which would otherwise culminate in expulsion. This fact should not be ignored, and, when other remedies do not produce prompt results, we need not hesitate to avail ourselves of the benefits derivable from a discriminative use of the drug. The most efficacious mode and form of administration is the hypodermic injection of morphia.

One-eighth to one-fourth grain will generally be an adequate dose. Begin with the minimum quantity, and repeat it if necessary.

In every case of threatened abortion occurring during the first three months of pregnancy, a careful examination ought to be made to ascertain the situation and position of the uterus. In some instances the symptoms depend upon retroflexion and retroversion, and they often quickly disappear when, upon placing the woman in the knee-chest position, and carefully using the fingers, or the elevator, the organ is returned to its normal position.

It is evident that preventive treatment is not suitable to all cases. The consummation of the process is sometimes clearly inevitable from its very incipiency. For a considerable time there may have existed evidence of the subsidence of the normal developmental activities, resulting, doubtless, from fœtal death. The usual symptoms of pregnancy have become less pronounced; there is a sense of weight and bearing in the pelvis, associated with a feeling of coldness in the abdomen, and sometimes a vitiated vaginal discharge. The woman is ill in body, and distressed in mind. In such a case interruption of pregnancy should never be prevented. On the contrary, cases which at first appear to be preventable, may, by a persistence and an aggravation of symptoms, ultimately pass the bounds, and become unqualifiedly unavoidable.

The signs of inevitable abortion are, profuse hemorrhage, with regularly recurrent uterine pains, dilatation of the os externum, descent of the ovum, and rupture of the membranes. While we cannot concur in the opinion expressed by some authors that rupture of the membranes is not proof positive that abortion is inevitable, we would caution against too hasty a presumption of its inevitability. Scanzoni has reported a remarkable case in which a woman was seized with profuse hemorrhage from the uterus in the third month of gestation; numerous clots were discharged, and all hopes of preventing the threatened occurrence were dissipated; *ergot* was given in full doses, the vagina was packed for many hours, and a sound was passed into the uterine cavity. After the hemorrhage had continued actively and passively for three weeks, a weak solution of perchloride of iron was injected; but, despite all interference, the pregnancy continued, and uickening was experienced six weeks later.

PROMOTIVE TREATMENT.—When the case has advanced beyond the limit where preventive treatment is available, the existing conditions do not always favor immediate adoption of efforts at uterine evacuation. The os uteri, or, indeed, the entire cervical canal, may be so small that it will not admit a single finger, while the uterus is pouring out blood in alarming quantities. In such an emergency something must be done at once to protect the woman from the serious consequences of excessive depletion, while the cervix is given additional time for expansion. In some cases dilatation may be speedily effected with the finger, if the uterus is kept within reach by firm pressure upon its fundus. If the ovum, in early abortion, is found intact within the os uteri, no interference whatever should be practiced, in the absence of urgent indications, for fear of rupturing it, and thereby complicating the delivery.

If the uterus cannot be emptied and the hemorrhage continue profuse, we may think best to pack the vagina. Still, in our own experience we have seen no inexorable demand for the tampon, and therefore we never use it. At best it is a dangerous expedient, and, unless we have at hand material for the purpose which we know to be strictly aseptic, we intend never to resort to the operation. The best material for a tampon is doubtless iodoform gauze. This should be cut into a long strip and gradually crowded into place, the near end being left at the vulva, so as to admit of easy removal.

In the introduction of a tampon much difficulty will be experienced, and great suffering inflicted, unless the precaution is observed to separate the labia and retract the perineum with the fingers of one hand, or by means of a speculum, while the article employed is being passed by the other hand. This subject is considered at length in another chapter, to which the reader is referred.

Before introducing a tampon, the vagina and vulva should be thoroughly washed with a disinfecting solution, and no tampon ought to be allowed to remain *in situ* for more than twelve consecutive hours. It can be renewed at the end of that time, if necessary, the precaution being taken to cleanse the vagina with an antiseptic solution after its removal. The ovum often passes into the vagina, when the tampon is taken away. If it does not, dilatation may be sufficiently advanced to enable the operator easily to remove the fœtus and envelopes in an unbroken state.

As soon as dilatation is great enough to admit of interference with a reasonable prospect of immediate success, it should be undertaken. In default of this condition, another vaginal plug, if required, may be introduced for twelve hours, but the use of this expedient for a period much in excess of twenty-four hours, is not to be recommended. The vagina becomes irritated, more or less blood decomposition ensues, and septic matters are generated.

In the practice of many excellent obstetricians the tampon is frequently used; and yet, as before said, we regard it as an expedient to be avoided when the indications can be met by remedies and other innocuous means. "During the course of an average practice of over a quarter of a century," says my esteemed friend, Dr. Henry A. Minton, of Brooklyn, "I have never resorted to the tampon; I have never had occasion to, the carefully selected remedy has always given such prompt and satisfactory results that nothing more was called for."

Emptying the Uterus.—The secundines, as well as the ovum, require removal, and this is not always accomplished with the utmost facility. The ovum or placenta forceps have been recommended, and can sometimes be successfully used, but cannot be regarded as safe except in those cases where the part retained protrudes from the os uteri. As will be seen in a succeeding paragraph, the fingers afford the safest and best means of extraction.

In miscarriage the fœtus is extremely apt to present by the feet, and the utmost care and discretion must be exercised to avoid parting head and trunk. This is not an uncommon accident, though by no means an insignificant one, as a retained head is not always easily extracted. In removing the fœtus, as likewise in getting away the placenta, the operator ought to work about the mass, loosening first one side and then the other, so that it may not be torn.

In these rare cases wherein the membranes are expelled and the fœtus retained, the latter should be extracted without unnecessary delay. A fœtus left behind would give rise to the same dangers as a retained placenta, namely, hemorrhage, and septic poisoning, and the rules of practice regarding unexpelled secundines would apply with equal force to an unexpelled fœtus. In the latter case the operation is attended with fewer difficulties than in the former.

It may occasionally happen that the symptoms of abortion

culminate in the expulsion of one fœtus and its membranes, while yet another child, with intact membranes, remains in utero. In such cases the physician should assume the expectant attitude, and patiently await developments. If there are no discernible signs of fœtal death, and no further abortive efforts, there surely is no excuse for interference. But should symptoms of miscarriage continue, or again become manifest, or should fœtal death or disruption of the membranes be discovered, delay ought to be brief, for the woman's interests are best subserved by speedy delivery.

In twin pregnancy, the membranes of the first child may be broken before fœtal expulsion, and remain behind. In such a case we should discreetly await the natural efforts, indulging a hope that the placenta will be extruded without serious disturbance of the uterine relations of the second child. Nature failing to accomplish this, and no untoward symptoms arising, the case, kept under strict surveillance, may be permitted to go undisturbed. It is evident that the existence of twin pregnancy is rarely recognized until interference has gone so far as to insure complete evacuation of the uterus.

When once the embryo or fœtus is expelled, the case has not always reached its climax of difficulty and danger. Indeed, in many instances serious difficulty is now first met. Expulsion of the ovum entire is not an infrequent occurrence in early abortion; but in other cases the embryo is first extruded, to be followed without much delay by the secundines. In later pregnancy this sometimes occurs, but in the main, the phenomena differ in some important respects. The abortive process goes on in a regular way until fœtal expulsion has been accomplished, when uterine efforts cease, and the placenta is retained for an indefinite period. Nor is such retention generally for a few moments only, as in labor at full term, but it is prolonged and persistent.

What gives to such a condition a serious aspect is, that there grow out of it certain dangers, namely, hemorrhage and septicæmia. After labor at full term, the placenta, on account of certain degenerative changes, is more easily separable, and may be either expressed or extracted. When retained after abortion, the uterus is too small to admit of successful expulsion of the placenta by abdominal pressure, the umbilical cord is too frail to bear traction, and the vulva, cervix, and uterine cavity, are not sufficiently expanded to admit the hand. These

are the conditions which render retention of the placenta after abortion a matter of so great moment to both physician and patient.

When and How to Remove the Secundines. — When the placenta is retained it sometimes becomes a point of great nicety to decide when to operate for its removal, and unless one has settled rules of practice for his guidance he will be likely to stumble and vacillate in a very embarrassing way. Physicians are not in perfect accord with regard to the treatment of these cases, and the consensus of opinion is not easily gathered. Many advise against early interference, preferring to wait hours, or even days, for natural expulsion. Others insist upon the advisability of immediate attempts to remove the retained secundines, even though the operation prove to be difficult.

The placenta proper is not formed until the third month of pregnancy, but the proper embryonic envelopes of an earlier

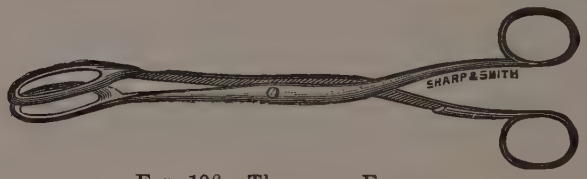


FIG. 106.—The ovum Forceps.

date constitute a mass several times larger than the embryo itself, and require treatment varying but little from that given the placenta. We find, however, that the uterine cavity and cervical canal are so small at an early period in pregnancy, that the finger is not always available, in which case interference should not be pushed to extremes, unless hemorrhage becomes troublesome, or there is intimation of septic influences; and then, the finger failing, the curette should be carefully employed. Such masses left in utero, being small, do not often create serious disturbance; but they ought not to be left for an indefinite period. A safe rule of practice is to resort to the curette without much delay when there are persistent indications of incomplete abortion.

In abortions of the third and fourth months, the treatment should differ from this in some important respects. The placenta is now formed, and must be removed; but when? and how?

The question "when" is one which merits more than a brief

answer. It has engaged the attention of obstetricians for many years, and has been discussed with much fervor. Formerly the practice was to follow the expectant mode of treatment, keeping careful surveillance of the patient, and interfering only when serious symptoms began to manifest themselves. In 1883 Dr. T. Johnson Alloway, of Edinburgh, in a communication to the American Journal of Obstetrics, took strong grounds in favor of immediate removal, in such cases, of the retained secundines. In the same number Dr. Paul F. Mundé, being incited thereto by Dr. Alloway's communication, went over the subject in a thorough manner, and unhesitatingly advocated a similar treatment. The following excerpt is from that article, the italics being ours:

"The future safety of the patient demands that the secundines should be *at once* removed after expulsion of the fœtus, in every case of abortion in which such removal can be accomplished without force sufficient to injure the woman." In the same journal, during the succeeding year, two other articles appeared



FIG. 107.—Leavitt's uterine Curette.

favoring the same treatment, one by Dr. S. Henningway and the other by Dr. G. N. Acker. We also observe that Dr. Egbert H. Grandin, in his translation of Charpentier's excellent treatise, advocates the same treatment.

This has been our own method of management for some seven or eight years, and we have had no reason to regret its adoption.

On the other hand, a large number of excellent obstetricians still favor the expectant plan, and in pursuing it, allow the placenta in some cases to remain for two or three days.

Immediately after expulsion, or extraction of the fœtus, the cervical canal ought to be examined, and if expansion be great enough to admit the finger, the placenta should at once be removed. With one hand on the hypogastrium the uterus can be pushed down into the pelvic cavity, and its contents thus brought within reach, when by gentle manipulation the entire mass may be removed. If the cervical canal will at first admit the finger nearly or quite to the internal os, gentle endeavor

will soon overcome resistance. We have often been surprised to find the finger easily penetrating the cervical canal, when, to a superficial examination, the os seems quite too small to receive it. If neither dilatation nor moderate dilatability exist, the operation should be delayed for a time, though the placenta ought not to be permitted to remain longer than twenty-four hours, unless violence in its removal would be unavoidable.

The chief exceptions to the foregoing rules arise in connection with those cases wherein the woman has either been greatly reduced by hemorrhage, which has temporarily ceased, or is in a state of extreme nervous erethism. Either of these conditions would contra-indicate interference. In the former case the patient must be kept under strict observation, while time is given the natural energies to recuperate. *China,* or some better indicated remedy, should meanwhile be administered. In event of recurrence of the hemorrhage the placenta should at once be removed. For the nervous irritability which may stand in the way of immediate interference, the most effective remedies are *actæa racemosa, caulophyllum, ignatia, hyoscyamus, asarum, camphor* (*2*^{x}), *coffea, stramonium, kali brom.,* or even *chloral hydrate.*

Delay in excess of twenty-four hours ought not, as a rule, to be permitted. Bring the patient carefully under the influence of an anæsthetic, and proceed with the necessary operative measures. In truth, it often happens that when the placenta is is retained, the woman, especially if of a nervous organization, is thrown into a condition of extreme nervous excitability, which cannot be wholly relieved while the placenta remains.

In abortions at the fifth month, operative procedures should not be delayed longer than ten or twelve hours. In abortions at the sixth month, we should not wait longer than two or three hours.

There are remedies which contribute a certain amount of aid towards expulsion of the uterine contents in these cases of incomplete abortion, and among them stands pre-eminently *Sabina. China* has been spoken of in high terms by some. If enough blood has been lost to produce an effect on the pulse or sensorium, this remedy will be peculiarly suitable. *Pulsatilla* has rendered good service in many cases. These remedies may

fail to expel the placenta, and yet, by encouraging uterine action and consequent dilatation of the cervical canal, render efficient aid to extractive measures.

In a moderate percentage of cases we succeed with digital, or even instrumental, efforts at removal, without an anæsthetic; but, in most instances, it is either advisable or necessary to resort to it.

Abortions at the fifth and sixth months can usually be terminated by delivery of the placenta as in labor at full term. It may be necessary to introduce the half-hand; but our experience has not led us to think so.

When the placenta has been removed in fragments, or when, in the absence of positive knowledge of what has been extruded, the finger is introduced for exploratory purposes, the roughened endometrium may lead one to suppose that something still remains. It is only by most painstaking examination that the truth can be elicited.

The placenta is sometimes so closely adherent to the uterus that removal of the entire mass, even in fragments, is impossible, and there remains the danger of hemorrhage and septicæmia. If profuse hemorrhage should at any time occur, water at a temperature of say 118° to 122° Fahrenheit, injected directly into the uterine cavity by means of a syringe throwing a gentle stream, free from air, is a most excellent means of overcoming it. There is little or no danger connected with this use of hot water, provided the os be large enough to permit free escape of the fluid injected. Such an injection ought never to be made by other than the medical attendant or a skillful nurse. A hot vaginal douche often answers well to keep the flow within bounds, and it may be resorted to before using the intra-uterine douche.

Similar injections have been given with excellent results for hemorrhage consequent on total retention of the secundines, substituting the tedious and painful use of the finger, or instruments. In most cases the uterus is stimulated to immediate contraction, and, when the cervical canal is sufficiently expanded, the result is usually placental expulsion and arrest of hemorrhage.

When by the means described we are unable to depress the uterus far enough to admit of digital or instrumental extraction of the placenta, we may cause the organ to descend by means of the volsella. Abortions are much more frequent in

multigravidæ than in primigravidæ, and it is chiefly in the latter, and in those whose abdominal walls present an unusual thickness of adipose tissue, that the fingers, aided by abdominal pressure alone, will fail. In these exceptional cases we may seize the cervix with the volsella, one with a slight curve being preferred, passing one blade within the os for about half an inch, and placing the other upon the outer aspect of the cervix at a corresponding level. With a hold thus obtained, the uterus may be drawn down without injury either to it or its ligaments, and held by one hand, while we operate with the other. If other instruments are used, care of the volsella must be given to an assistant.

Precedence and preference are by some given the placenta forceps and the small blunt hook as a means of extracting the placenta; but most operators prefer the fingers. Still there are cases in which, from our inability to bring the uterine cavity within reach, or from the shortness of the fingers, the instru-

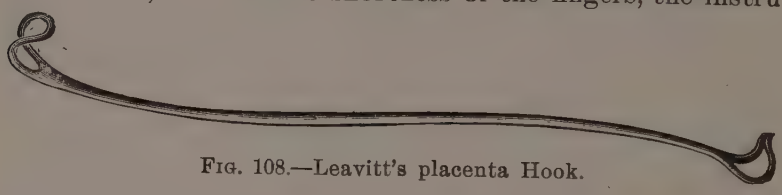


FIG. 108.—Leavitt's placenta Hook.

ments mentioned are capable of rendering efficient aid. Separation of adherent portions of the placenta should never be entrusted to instrumental means, unless the sense-guided fingers utterly fail. The placenta forceps are constructed with slim shanks, and sometimes spoon-like blades, the inner surface of the latter being roughened, so as to afford a firm hold. In order to pass the instrument, the fingers of one hand should be laid in the vagina, with their points at the os uteri, and along their palmar surface the instrument can be directed into the uterus. With the handles well back against the perineum, the blades are separated and an effort made to inclose the placenta. This is an operation which requires some skill, and, like many other obstetric procedures, is more easily described than successfully performed. Extreme care should be exercised to avoid traumatism. When the placenta is taken hold of, forcible traction ought not to be made, as its fragile structures are easily broken. By gentle rotation of the instrument, first one way and then the other, associated with moderate traction, the retained part can sometimes be delivered in one mass.

Small hooks have been provided with which to remove the placenta. We present a cut of an instrument of this kind which we have found most effective. The stem has a sigmoid flexure, which favors easy introduction of either end, and the fenestrated hooks are intended for use, one on the anterior, and the other on the posterior, wall of the uterus. By gentle manipulation and deft search of the uterine cavity, the retained secundines can be secured and slowly drawn away.

In nearly all instances bleeding ceases as soon as the uterus is fully evacuated; and when it persists, especially if it comes in little gushes, at intervals, we may be quite sure that a fragment of the ovum, or a hard coagulum, remains behind. The finger should be again passed, if the cervix will admit it, and every part of the uterine wall examined. If anything is found it must be removed. If bleeding still continue, as it will rarely do, the cavity should be scraped with the curette.

NEGLECTED CASES.—The most threatening emergencies which the physician is called to meet, sometimes grow out of the neglect of women to avail themselves, in season, of professional care. It is assumed that the abortive act has been consummated, until, after the lapse of days or weeks, serious symptoms are manifested. A passive flow has existed for some time, when suddenly the blood gushes forth so profusely that the woman's life-forces are speedily brought low. A physician is hastily called, and he finds his patient exsanguine and syncopal. The flow has temporarily ceased. Reflecting upon her low state, and realizing that the last few drops are those which kill, his good sense tells him that the present is no time for interference. The voice of a wise monitor whispers: "To disturb those clots may be to kill," and he wisely heeds it. He revives his patient by judicious stimulation, and the administration of *china,* while a constant watch is kept to prevent an unobserved renewal of the flow. Should it occur, he will remove the secundines without delay; but in its absence, time for recuperation of the vital forces is given, and then the case is terminated without danger.

In another instance the placenta, through neglect, is suffered to remain in utero. After a time certain ill-feelings are experienced: there is a chill, the pulse is accelerated, the temperature rises; then follow headache, backache, fetid discharges, prostration, and all the signs of what has been called irritative fever. A physician is called in to explain the slow "getting up," and

recognizes the alarming condition of his patient. He does not hesitate nor delay:—the uterus is at once emptied and washed out with a disinfecting solution. This treatment is generally followed by marked and immediate improvement; but sometimes the poisonous matters have been absorbed in so great quantities, and suitable treatment has been so long delayed, that the patient cannot be rallied.

CHAPTER IX.

PATHOLOGY OF THE OVUM AND DECIDUÆ.

The physiological changes which take place in the uterine mucous membrane as the result of impregnation, sometimes pass the usual bounds and become pathological. It appears probable that abortion not infrequently owes its origin to such a cause.

Endometritis.—This may be either acute or chronic. The latter variety of the affection is divided into three distinct forms, namely, 1. Endometritis decidua chronica diffusa; 2. Endometritis decidua tuberosa et polyposa, and 3. Endometritis decidua catarrhalis.

The causes of the first form probably depend, in a great measure, on endometritis which antedates conception. Syphilitic infection, excessive physical exertion, and fœtal death, with retention, are also set down as etiological factors. The anatomical changes which take place consist in thickening and hardening of the decidua, resulting from diffuse development of new connective tissue, and proliferation of decidual cells. The decidua vera and decidua reflexa may be separately or jointly involved in the processes, and changed in whole or in part. According to Duncan, the hypertrophied decidua always presents evidence of fatty degeneration, unequally advanced in different parts. When the changes are wrought in the latter part of pregnancy, they pursue a notably chronic course, are limited in extent, do not involve the placental decidua, and pregnancy does not invariably suffer interruption. Premature expulsion is caused in these cases by death of the ovum from imperfect nutrition, or by the exciting of reflex uterine action. The ovum, after death, generally retains its connection with the decidua for a time, and finally the diseased decidua and attached ovum are expelled. The decidua is a thick triangular fleshy mass, and has attached to some part of its inner surface, the blighted ovum. Expulsion is apt to be a slow process, owing to the adhesions which have formed between the decidua and the deeper uterine tissues. If these include the placental decidua, much difficulty will be experienced in natural separation, and the case is liable to be complicated by profuse hemorrhage.

The causes of the second variety of chronic endometritis are obscure. Virchow regarded syphilis as one of them. Gusserow says that when conception closely succeeds delivery, the recently formed vascular uterine mucous membrane may take on abnormal proliferative processes. This variety of endometritis and the succeeding pathological changes are limited, with rare exceptions, to the decidua vera, and prefer for their location the anterior and posterior walls of the cavity. "The

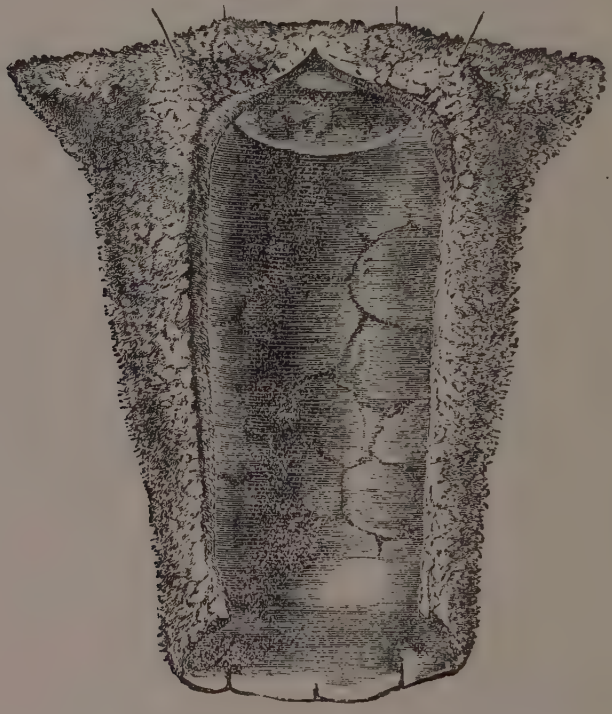


FIG. 109.—Hypertrophied Decidua laid open: Ovum at the fundus.

uterine surface of the decidua is rough, and covered with coagulated blood, while the entire mucous membrane is exceedingly vascular. Upon that surface of the decidua which is directed towards the ovum, are situated large excrescences or elevations, the prevailing shape of which is polypoid. They may, however, appear in the form of nodules, of cones, or boss-like projections, provided with a broad, non-pedunculated base. Their height is from one-quarter to one-half inch, and their surface is smooth, very vascular, and devoid of uterine follicles.

The latter, however, are plainly visible on the mucous membrane intervening between the polypoid outgrowths, but they are compressed, and their orifices constricted or obliterated by the pressure of whitish, contracting bands of newly developed connective tissue. Similar fibrous bands surround the blood-vessels. On section, the larger prominences sometimes appear permeated with coagulated blood, and narrow, cord-like bands of hypertrophied decidual tissue occasionally form bridge-like connections between neighboring polypi. The uterine follicles are, in some cases, filled with blood-clots. The epithelium is often absent from the uterine surface of the decidua, except around the orifices of the follicular glands, and the deeper decidual tissues contain large numbers of lymphoid cells. The cells of the decidua reflexa frequently undergo fatty degeneration. The placental villi may show hypertrophy of their club-shaped ends, or be the seat of myxomatous growths, in which case their cells are granular and cloudy. The fœtus is generally dead and partially disintegrated. This form of endometritis decidua is, consequently, usually accompanied by abortion, which occurs predominantly at an early stage of pregnancy."—LUSK.

The third form of chronic endometritis attacks multigravidæ oftener than primigravidæ, and runs a comparatively mild course. It has been termed *hydrorrhœa gravidarum,* by which is meant a collection of yellowish watery albuminous, and sometimes bloody, fluid between the decidua reflexa and vera, which is discharged at intervals during pregnancy. Many theories have been formed regarding its etiology. Some have regarded the discharge as due to rupture of a cyst between the ovum and uterine walls. Baudelocque thought it proceeded from transudation of the liquor amnii through the membranes, while Burgess and Dubois believed it depends on rupture of the membranes at a point distant from the os uteri. Mattei has referred it to the existence of a sac between the chorion and amnion. A single discharge doubtless occasionally proceeds from the two last-mentioned causes, but repeated loss must be referred to other sources. Hegar's theory, that it is the result of abundant secretion from the glands of the uterine mucous membrane, which accumulates between the decidua and chorion, and escapes through the os uteri, is probably nearer the truth. The real pathological changes which take place are vascularity, hyperæmia, and hypertrophy of the interstitial connective

tissue, and of the glandular elements of the decidua. The inflammation involves the decidua vera by preference, but may simultaneously affect the decidua reflexa. The fluid which results is thin, watery, muco-purulent, or sero-sanguinolent, resembling the liquor amnii both in color and odor. When no obstacle to its free escape is interposed, its discharge is continuous, but when it is confined, a considerable quantity may collect, until finally the resistance is overcome, and there is a sudden and copious discharge. It is often expelled at night while the patient is sleeping, very likely by reason of uterine contraction. In some cases even a pound, or more, of the fluid is thus lost. Hydrorrhœa gravidarum is observed at all periods of pregnancy, but most frequently in the latter months. It often occurs as early as the third month.

Diagnosis involves differentiation between it and rupture of the membranes, escape of fluid sometimes confined between the amnion and chorion, and escape of fluid emanating from the hypertrophied decidual glands. The chief point of differentiation between hydrorrhœa and escape of fluid from the space between the amnion and chorion, is that in the latter case there is but a single discharge, while in the former there is either continual draining or repeated gushes. It is not always easy to distinguish between hydrorrhœa and escape of the liquor amnii. In the former we find that pains are absent, the os uteri unopened, and *hallottement* can be made out. If the membranes are ruptured, labor is quite certain to ensue, though cases of long retention after rupture have been recorded. A repetition of the discharge, and continuance of pregnancy, will materially aid in clearing up the diagnosis. Hydrorrhœa, though apt to cause alarm, rarely presents serious phases, though Veit says that the uncontrollable vomiting of pregnancy is sometimes attributable to it. The pregnancy is rarely interrupted, and the woman feels rather relieved by the discharge. During the existence of this form of endometritis the general health of the woman should be as well maintained as possible, by strict observance of hygienic principles. Sexual intercourse, vaginal douches, and all possible sources of local irritation, should be avoided. The remedies, among which we shall be most likely to find the similimum, are *arsenicum album, lachesis, natrum muriaticum, mercurius, calcarea carb.* and *sulphur.* If uterine contractions supervene, the utmost quiet must be insisted upon, and *caulophyllum, pulsatilla,* or *viburnum* administered.

PATHOLOGY OF THE CHORION.—The only affection of the chorion that has yet been described is that form of degenerative change which results in the development of what is known as vesicular or hydatidiform mole (cystic disease of the chorion, hydatidiform degeneration of the chorion). It is of rare occurrence. Madame Boivin saw but one case in 20,375 delivered. Before the time of Cruvelhier, the vesicles which characterize this morbid product were, from their close resemblance, supposed to be real hydatids.



FIG. 110.—Hydatidiform Mole.



FIG. 111.—Hydatidiform Mole. (Placental origin.)

There is a little disagreement concerning the structures involved in the myxomatous degeneration here considered, careful dissection disclosing the villi of the chorion in various stages of change; but still there is not perfect accord concerning the histological elements affected. Heinrich Müller locates the affection in the external membrane covering the villi. Mettenheimer maintains that a cystic transformation of the cells of the interior of the villi is the essential pathology. His views are also shared by Pajot. Virchow locates the morbid change in the villi and holds that what fluid there is, is simply the intercellular tissue fluid. His views have been most commonly accepted. The resulting vesicles vary in size from that

of a millet seed to that of a walnut. The vesicular fluid contains musin, but the large cysts a less quantity than the smaller. All the villi are not involved in the morbid process. Development is by gemmation or budding, not from single stems, but mainly from vesicles already formed. They frequently aggregate a considerable mass and present the general appearance represented in figures 110 and 111.

When degenerative development begins in the first month of pregnancy, as indeed it usually does, the degeneration involves the whole chorionic surface. Death and absorption of the embryo may ensue, leaving the amniotic cavity entirely free from solid matters. If the placenta has already been formed, degenerative changes do not go beyond this structure, and if sufficiently extensive to destroy the fœtus, the remains of the latter are found in the amniotic cavity, which sometimes contains an excess of fluid. If only a few of the placental cotyledons are implicated, the fœtus may continue its functional activity for a time, and even reach perfection. The morbid changes generally take place within the decidua serotina, but that boundary is sometimes exceeded. Volkmann reports a case in which the degenerative process invaded the uterine blood sinuses, and, by pressure, led to so extensive an atrophy and absorption of the uterine walls, as to leave only a thin septum between the mole and the peritoneal covering of the organ. "The cavity formed by this process of erosion in the uterine parenchyma was larger than the uterine cavity proper, and presented intersecting trabeculæ resembling the columnæ carneæ of the cardiac ventricles." Such results, however, probably depend on a morbid condition of the uterine walls, proceeding from malnutrition. Similar cases, with fatal results, are reported by Schroeder.

Sometimes the adhesion of the mass to the uterine walls is very firm, and may interfere with its expulsion. Nutrition of the altered chorion is carried on through its connection with the decidua, which also is often diseased and hypertrophied.

Causes of Hydatidiform Degeneration.—The etiology of this disease has evoked considerable discussion. Ruysch, Scanzoni, Hewitt and others maintain that the changes in the chorionic villi which characterize it are always preceded by embryonic death. In support of this view allusion has been made to the fact that, in nearly all cases, the embryo has been entirely absorbed, and also to the occasional occurrence of hydatidiform degeneration

of the chorion of a dead fœtus in twin pregnancy, while that of the living one remains healthy. That the exciting cause of the degenerative changes is often, if not usually, a morbid maternal condition, seems likely from its repetition in the same woman, by its co-existence with endometritis, or with extensive uterine fibromata, and by the existence in most cases, according to Underhill, of a cancerous or syphilitic dyscrasia in the mother. But still better evidence is found in the clinical observation that myxomatous changes have been observed involving a part of the placenta with a living child. In Germany the opinion prevails that the cause of these degenerative changes is found in endometritis. If this be accepted, we must conclude that the degenerative changes generally precede and produce fœtal death. The disclosure of the true pathology of hydatidiform degeneration has disposed of the question, formerly mooted, of its occurrence independently of impregnation.

Symptoms and Course.—Cystic disease of the ovum may exist for a time without developing any symptoms of sufficient prominence to draw attention. Later it is observed that the ordinary course of pregnancy has been changed in some important regards. Some of its most common symptoms may disappear, but such changes are by no means constant. The most prominent sign of the existence of perverted development consists in a failure of correspondence between the uterine enlargement and the computed period of utero-gestation. Thus, at the third month, the uterus may be found as high as the umbilicus, or higher. On the other hand, if the cystic development began early, the organ may be decidedly smaller than at a corresponding period in normal gestation. There is more general disturbance of the health than there ought to be, nausea and vomiting being apt to become excessive. Lumbar and sacral pains are prominent and distressing in proportion to the rapidity of the abnormal growth. About the third month, sometimes earlier, there begins a more or less profuse watery and sanguineous discharge, generally at intervals, which resembles currant juice. These losses doubtless depend on breaking of one or more of the cysts, and escape of the contents, brought about by painless uterine contractions. Though not usually excessive in quantity, they are sometimes so profuse and frequent as to reduce the woman's vital forces to a low, and even dangerous, condition. In the discharge are also found portions of cysts, and sometimes masses of considerable size.

Expulsion of the degenerate mass usually takes place before the sixth month, but it may be delayed beyond the usual period of mature utero-gestation. As in the case of ordinary abortion, the hemorrhage ceases after the uterus has been completely evacuated, but retained portions of the tumor may give rise to protracted and profuse bleeding. The entire mass is sometimes expelled enclosed in an unbroken decidua.

Diagnosis.—This will rest in part on subjective symptoms, such as the sensations accompanying fœtal death; but mainly on objective symptoms.

The uterus as felt through the abdominal walls sometimes presents irregularities, but such as do not closely resemble fœtal outlines, and the organ imparts to the examining hand a peculiar boggy, or doughy feel, with sometimes distinct fluctuation. On examination *per vaginam*, the lower uterine segment is found to present similar characters. *Ballottement* yields negative results, and fœtal movements are not felt, though they may be simulated by uterine contractions. The sounds of the fœtal heart are diminished in intensity in the early stage of degenerative change, and subsequently quite lost.

In these cases where the cystic degeneration implicates but a part of the ovum, diagnosis cannot always be made with any certainty, unless we observe that duet of characteristic signs, rapid increase of uterine development and the peculiar discharge in which whole vesicles are at times found. Absence of the more important signs of normal pregnancy should be given due weight.

Prognosis.—The character of the prognosis in cases of hydatidiform mole is governed largely by the frequency and violence of the accompanying hemorrhages. It is reassuring in the majority of cases, as far as it regards the mother; but the life of the fœtus is, of course, almost invariably sacrificed.

Treatment.—The treatment differs but little from that prescribed for ordinary abortion, and consists, in the main, of measures calculated to control the hemorrhage, and promote expulsion of the degenerate product of conception. Manual and instrumental non-interference is generally advised until uterine action is excited, unless threatening symptoms are meanwhile developed. When contractions begin, the tampon should be used, if called for by profuse hemorrhage with inability to deliver, and uterine action sustained by appropriate remedies.

Under the expectant plan of treatment there is considerable danger to be apprehended from sudden and violent hemorrhage; therefore, unless arrangements of the best sort can be made for prompt professional attention, the question of immediate interference merits thoughtful consideration. Dilatation may be begun with tents, and afterwards continued with the finger, or with the dilators of Molesworth, Barnes or Allen. The remaining steps of the operation will be easy. With the fingers the mass is removed either whole, or in fragments, and the main difficulties of the case are soon overcome. Since there is sometimes firm adhesion of the cystic mass to the uterus, very energetic attempts at complete separation should be avoided.

The Placenta.—The usually round or oval shape is not always preserved, but it may be crescentic, or horse-shoe shaped, or have an irregular form, and be spread over a considerable surface, in consequence of an unusual number of the chorionic villi being concerned in its formation. That anomaly of form which deserves special mention, is the one in which a supplementary placenta exists. This is known as placenta succenturia, the accessory developments being due to the persistence of isolated villous groups, which form vascular connections with the decidua vera. They are of consequence, inasmuch as they are liable to be left in utero, and give rise to hemorrhage. Hohl says they always form at exactly the junction of the anterior and posterior uterine walls, and the portions of placenta on each side of the line become nearly separated.

SIZE.—Placentæ vary also in size, the dimensions of the organ bearing a pretty constant relation to that of the child. Hypertrophied placentæ occur chiefly in connection with hydramnios, and consist of a genuine parenchymatous hyperplasia, the fœtus being dead and shriveled. In some cases the organ is remarkably small, which condition is referable to defective development, to premature involution, or to hyperplasia of the connective tissue, with subsequent contraction. It should be borne in mind, however, that the dimensions of the placenta are modified by the state of the placental vessels. When the latter are empty, the organ is small, and when filled, it is greatly increased in size.

When true atrophy of the placenta exists, the vitality of the fœtus is sure to be more or less impaired. Whitaker believes that atrophy of the organ depends either on a diseased state

of the chorionic villi, or of the decidua in which they are implanted. The latter is supposed to be the more common cause, and it consists in hyperplasia of the connective tissue of the decidua, which presses on the villi and vessels, and results in atrophy. Placentæ have been found in a state of atrophy though the tissue of the organ itself showed nothing peculiar.

SITUATION.—The most frequent situation of the placenta is at or near the fundus uteri, close to the orifice of the Fallopian



FIG. 112.—Fatty Degeneration of the Placenta.

tube, on one side of the uterus or the other, but it is occasionally implanted elsewhere, as, for example, over the internal os, as in placenta prævia, and at various points in the abdominal cavity in connection with extra-uterine pregnancy.

DEGENERATIONS AND NEW FORMATIONS.—The most common form of degeneration is the *fatty*, which may be circumscribed, or diffused. It is normally present in a mature placenta, and is probably a change which facilitates the final separation of the organ. When it occurs early in pregnancy it is often responsible for premature completion of the occurrence which normally takes place at a later period. Its cause is doubt-

less referable to tissue changes which interfere with proper nutrition, proceeding, perhaps, in the first instance, from the woman's state of health. Syphilis, doubtless, in some cases, has an influence in its production. The placental tissues often present yellowish masses of different sizes, which consist largely of molecular fat, penetrated by a fine network of fibrous tissue; but true fatty degeneration has a predilection for the chorionic villi. The latter, on careful examination, are found to be altered in their contour, and loaded with fine granular fat-globules.

Other morbid states of the placenta are: 1. Amorphous calcareous deposits, which are found on the uterine surface of the placenta, in the decidua serotina. Sometimes these are isolated grains or needles, sometimes calcareous masses. They are composed of amorphous carbonates and phosphates of lime and magnesia. The process sometimes extends to the fœtal portion of the placenta. When the change begins in the latter part, it is generally limited to it, and affects the small blood-vessels of the villi, attacking first their terminal ramifications, and gradually implicating the trunks. 2. Deposits of pigment, usually attributable to alterations in the hæmoglobin of extravasations, found within the blood sinuses or villi of normal placentæ, are sometimes excessive. 3. Œdematous infiltration of the placental tissue is sometimes observed. According to Lange, it occurs only in connection with hydramnios. 4. Cysts are frequently found near the center of its concave surface, and vary from a few lines to several inches in diameter. Cysts of considerable size have been found also on the fœtal side of the placenta, but below the amnion and chorion. Their contents are solid and liquid. The amnion, covered with pavement epithelium, forms the cyst wall. A reddish, cloudy, thin fluid, makes up the contents. Ahlfeld regards the cysts as liquefied myxomatous formations. They may also develop from apoplectic foci. 5. Circumscribed tumors are occasionally found on the fœtal side of the placenta, beneath the amnion. Spiegelberg tells us that these are fibromatous or sarcomatous in character. They sometimes attain considerable size. Myxoma of the placenta, consisting in hyperplasia of the villi, and myxoma fibrosum placentæ, characterized by the fibroid degeneration of the basement membrane in isolated villi, are the chief remaining varieties of placental neoplasms.

SYPHILIS OF THE PLACENTA.—According to Charpentier, Fränkel, in concert with Waldeyer and Kolaezek, was the first to give serious attention to the subject. He collected fifteen cases of syphilis transmitted from the father, wherein nothing more than hypertrophy of the villi could be found. When the mothers were diseased, the lesions were more complex. Following were his conclusions:

1. There is syphilitic placenta, presenting characteristic features. 2. It is found only in cases of congenital or hereditary fœtal syphilis. 3. The seat of the lesion differs when the mother is affected from that when the virus is merely carried by the spermatozoa to the ovule. In a case like the latter, the placenta is degenerated, the fœtus is diseased, the villi of the fœtal placenta are filled with fat granules, while their vessels are obliterated and their epithelial coverings either thickened or absent. In case the mother is tainted, one of these conditions may be present: 1. If the mother is infected during the copulative act, syphilitic foci often develop in the maternal placenta. 2. If the mother is syphilitic before impregnation, or soon becomes so, the chances of the placenta being healthy are about even. 3. If the mother is not infected till she has passed the seventh month, both fœtus and placenta escape. 4. Inoculation of the fœtus during delivery has not been established.

APOPLEXY AND INFLAMMATION OF THE PLACENTA.—Hemorrhage into the placenta sometimes takes place from congestion of the utero-placental vessels, proceeding from disturbances in the mother's vascular system. The extravasation may be into the placental parenchyma, into the serotina, or into the uterine sinuses. Extravasation is due mainly to morbid changes in the decidual vessels, often as the result of placentitis. The blood coagula undergo the ordinary retrogressive metamorphoses. Occasionally cystic, fatty, or calcareous degeneration takes place. The hæmatomata by pressure may interfere with proper nutrition of the fœtus, and result in its death.

Placentitis has been alluded to by some authors as a common disease, and various pathological changes have been attributed to it, such as hepatizations, purulent deposits, and adhesions to the uterine structures. Its existence is now disputed by many, who contend that the morbid changes alluded to are due simply to retrogressive metamorphoses in coagula. "What has been taken for inflammation of the

placenta," says Robin, "is nothing else than a condition of transformation of blood-clots at various periods. What has been regarded as pus is only fibrin in the course of disorganization, and in those cases where true pus has been found, the pus did not come from the placenta, but from an inflammation of the tissue of the uterine vessels, and an accidental deposition in the tissue of the placenta." Other writers affirm its existence, and assign to it etiological relations with metritis and endometritis. According to their view the inflammation originates in the serotina, or in the adventitia of the fœtal arteries, generally producing granulation tissue, which, from contraction, produces compression of the placental vessels, which, in turn, may result in their obliteration, and lead to fatty degeneration of the villi. Should the inflammatory action be recent, the friability of the new granulation tissue may result in retention of parts of the placenta. Placentitis is sometimes accompanied with hemorrhages which prove fatal to the fœtus. It rarely results in suppuration.

Hydramnios.—The chief pathological condition of the amnion is that in which the liquor amnii exists in excessive quantity, known as *hydramnios*. This term should be restricted, however, to those cases in which the amount of fluid is so large that, by its pressure on the uterus, the abdominal or thoracic viscera, or the fœtus, morbid symptoms are developed. Dr. Kidd limits the term to cases in which the amnion contains more than two quarts of the liquor amnii; while Charpentier says "All authors agree that when the quantity exceeds 32 or 48 ounces, there is dropsy of the amnion."

Signs and Symptoms.—These manifest themselves chiefly in the direction of overdistension of the uterus, the effects of which first become noticeable at the fifth or sixth month, when the abdominal development may be nearly as great as that of normal pregnancy, at full term. The distension ultimately becomes so great that various distressing symptoms ensue, such as palpitation of the heart, dyspnœa, neuralgia and œdema of the labia and lower extremities, epigastric distress, dysuria, nervous disturbances and painful locomotion. The bowels are usually constipated, sleep is disturbed, the spirits are depressed, and, in some cases, delirium, and even eclampsia follow.

In the latter part of gestation, under the influence of so great distension, the abdomen assumes a peculiar shape, which, however, is mainly an exaggeration of the abdominal outline de-

scribed in the earlier part of this work. What we mean by this is, that the development is mainly in front, while the sides are relatively flattened. The outline of the uterus can easily be felt, there may be no marked evidence of fluctuation, though this is not a constant sign, while the walls are extremely tense. Fœtal movements are indistinct, and sometimes unrecognizable. Vaginal ballottement cannot be successfully practiced in every instance, on account of the soft œdematous condition of the uterine tissues. Palpation of the overdistended abdominal walls is painful, and in some cases cannot be borne.

DIAGNOSIS.—In some cases of hydramnios, differentiation is attended with some difficulty. First of all, we should endeavor to recognize the existence of pregnancy, having done which, we will have to distinguish between several possible conditions, namely, twin pregnancy, ascites accompanying pregnancy, and ovarian dropsy associated with that condition. In uncomplicated twin pregnancy, the form of the uterus would differ in the direction of lateral expansion and anterior flattening, while the sounds of the fœtal heart would be heard. Fluid in the peritoneal cavity, again, would give rise to lateral expansion and fluctuation, while anteriorly the fœtal outline would be felt. Ovarian dropsy, in association with pregnancy, is a rare complication, and might present some difficulties. However, the ovarian growth would be pushed to one side by the enlarged uterus, thereby giving to the abdomen an uncharacteristic appearance. Fœtal movements and the fœtal outlines would be felt, and to both palpation and auscultation there would be evidence of lateral uterine displacement. The diagnosis of coexistent hydramnios and ascites is difficult. Fluctuation would, perhaps, be felt all over the abdomen, but whether within or without the uterine cavity, is, at the moment, not easily determined. Fluctuation will be more distinct upon the sides, and the characteristic form of hydramnios alone, will be lost. Aid to diagnosis is afforded by the rhythmical contractions of the uterus, though they are felt less distinctly than in normal pregnancy. Vaginal examination will afford some evidence of an excess of amniotic fluid.

TERMINATION.—Premature expulsion of the fœtus very often happens as the result of fœtal death, of placental separation, or of overdistension of the uterus. The latter condition renders uterine action feeble, and hence the first stage of labor is greatly prolonged. Should uterine inertia prevail in the third

stage, hemorrhage is liable to ensue. In general, however, upon rupture of the membranes and escape of the amniotic fluid, vigorous contractions ensue, and lead to precipitate expulsion. Involution is apt to be slow and imperfect.

Prognosis.—In four cases out of thirty-three collected by McClintock, the women died after labor, the result being attributable to their debilitated state. Fœtal mortality is very great. Nine of the thirty-three children were born dead, and ten died within a few hours.

The Effect on Labor.—Even in those cases wherein the amniotic fluid is excessive in quantity, but still not sufficiently so to acquire the title of hydramnios, the effect on labor is to create feeble uterine action, and cause delay. The effect is more marked in the first stage of labor, since, at its close, the membranes usually break.

Treatment.—For the disease itself no remedy has yet been found. Should the mother's condition become distressing and perilous, the physician will feel called upon, in the interest of his patient, to puncture the membranes and draw off the liquor amnii. Inasmuch, however, as this procedure is sure to be followed by fœtal expulsion, it ought to be postponed as long as the woman's safety will permit. Playfair suggests the possibility of puncturing the membranes with a fine aspirator needle, and modifying the distension by drawing off the fluid only in part, thereby affording relief without bringing on premature labor. Disturbance of the mother's heart is one of the symptoms most urgently calling for interference. If during labor the excessive distension of the uterus retard dilatation of the os, the membranes should be ruptured, and the amniotic fluid permitted to escape. The unusual danger of post-partum hemorrhage, which threatens in these cases, ought to be borne in mind, and the best precautions adopted.

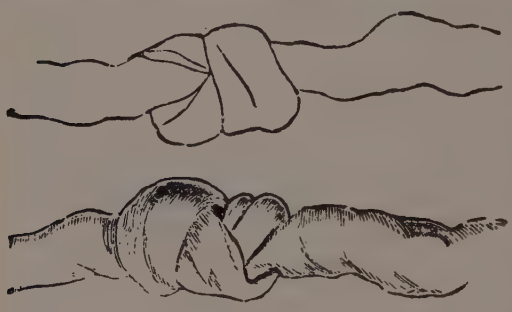
For such women, the homœopathic physician will think of antipsoric remedies, and will select those which, from special symptoms, seem best indicated.

Deficiency of the Amniotic Fluid.—When the liquor amnii is deficient in quantity fœtal movements are restricted, and hence are liable to cause unusual pain to the mother. Direct pressure of the uterus on the fœtus is liable to cause deformity. The amnion not being separated from the fœtus in the early part of pregnancy, abnormal amniotic folds and adhesions between the amnion and fœtus may form. Fœtal deformity

and intra-uterine amputation may result from mechanical compression by the fœto-amniotic bands thus formed.

ANOMALIES OF THE AMNIOTIC FLUID.—The amniotic liquor does not present constant characters. Instead of being limpid, and of an inoffensive odor, it may be thick and emit a disagreeable smell. The cause of these variations is not fully understood.

Pathology of the Cord.—The average length of the cord is about twenty-two inches, but there are extreme variations, the maximum length being about one hundred and eight inches, and the minimum about three inches. When unusually long, the cord is liable to complicate pregnancy by becoming tightly drawn about the neck or limbs of the fœtus. In this way intra-uterine amputation is probably sometimes performed, and by a similar process fœtal life may be destroyed.



FIGS. 113 AND 114.—Knots of the Umbilical Cord.

KNOTS.—Knots of the umbilical cord are found once in two hundred cases. They are doubtless produced by the fœtus in its movements passing through loops in the cord. Those formed during parturition are loose, and in any case, if there is the usual quantity of Wharton's gelatine in the cord, little harm is likely to result from a knot made at such a time. When formed during pregnancy, their long continuance, and the consequent absorption of Wharton's gelatine occasionally produce fatal results.

TORSION.—A certain amount of torsion is frequently observed, and without consequent evil results; but occasionally it is so extensive and strong as to destroy fœtal life. It occurs most frequently about the middle of pregnancy. The arteries of the cord take a spiral direction about the umbilical vein, and this very arrangement serves as a protection to the circulation; but a few twists are sufficient to interrupt it. Torsion is supposed to result from rotation of the fœtus on its longitudinal axis, but whether it happens during fœtal life, is a moot question. Martin claims to have demonstrated that the effect is not from active fœtal movements, but is a post-mortem

occurrence. In support of this, Schauta advances the following propositions: 1. The large number of twists generally found indicate this, because any one of them is capable of producing fœtal death. 2. It is improbable that the healthy cord can suffer such torsion, inasmuch as compensatory reverse rotation would be caused by its elasticity. 3. Twenty-five artificially-induced twists in the cord caused rupture. As high as three hundred and eighty torsions have been found in a single funis.

COILING OF THE CORD.—The umbilical cord is often found wound around the neck or other parts of the fœtus. It is observed in one out of every eight or ten cases. As high as seven turns about the neck have been observed, though it is rare to find more than two. When rapidly formed they may lead to immediate death of the fœtus. They are especially liable to complicate delivery. During descent of the child, the loops



FIG. 115.—Torsion of the Cord. (Martin.)

which were at first but moderately tight, are drawn upon, and thus strangulate the child before the complication is recognized and relief afforded. Strangulation probably occurs more slowly during intra-uterine life, owing to gradually increased tension of the coils. In this manner the fœtal head has in some instances been nearly amputated. From shortening of the cord thus produced, there may result anomalous positions, premature separation of the placenta, retardation of labor, and even fœtal death.

CYSTS OF THE CORD are sometimes observed. They are formed within the amnion, and are the result of liquefaction of the mucoid mass, or by accumulation of serum between the epithelial layers of the allantois.

HERNIA.—Protrusion of a loop of intestine into the umbilical cord, from errors in development, are occasionally met. In our own practice we have encountered the condition but once.

Hernia may occur in otherwise well-developed fœtuses, but it is frequently associated with other deformities, such as stricture of the rectum, imperforate anus, distortion of the lower limbs or of the genitals, resulting, in the main, from traction of the displaced viscera on adjoining parts. The hernial sac is composed of the amnion and the peritoneum, and its contents are convolutions of the intestines, though other organs are sometimes included to such an extent as to leave the abdomen nearly empty.

CALCAREOUS DEPOSITS have been found in the cords of fœtuses presenting evidences of syphilis.

STENOSIS OF THE VESSELS.—Atheroma, and consequent thrombosis, have been known to give rise to stenosis of the umbilical arteries. In syphilitic fœtuses, chronic phlebitis, with the new connective tissue developed in connection with it, may produce stenosis of the umbilical vein, and occasionally of the arteries.

ANOMALOUS INSERTION.—Anomalies in the distribution of the vessels of the cord are often met. The insertion may be into the margin instead of the center of the placenta, and then the latter organ is known as *battledore placenta*. The cord is sometimes found to separate before reaching the placenta and spread its vessels on the membranes, in which case it is known as *insertio valamentosa*.

Pathology of the Fœtus.—Comparatively little is known of the diseases to which the fœtus is liable, but enough has been observed to teach us that it may suffer from nearly as great a variety of pathological states as the young child. Death of the fœtus is in such a manner often compassed. Following are some of the ailments which are known to attack the unborn:

INFLAMMATIONS of various parts have been known to exist, the peritoneum being a common seat of attack. The pleura and lungs have often been found involved.

FEVERS are transmitted from the mother, and the fœtus doubtless at times becomes idiopathically their subject. When the mother suffers from smallpox, she usually miscarries, and the fœtus is most commonly observed to be infected.

SYPHILIS is a disease from which the fœtus does not escape. Premature labor and fœtal death are common results of the affection. The evidences of involvement of the offspring are not always patent at birth, but a careful examination post-partum, or a thoughtful consideration of the symptoms subse-

quently developed, in living children, discloses the true disturbing cause.

The sensitiveness of the fœtus to certain POISONS is shown in the numerous reports of lead and malarial poisoning. M. Paul collected eighty-one cases in which there was evidence in dead fœtuses of the toxical effects of lead. In some instances the fœtus was affected while the mother escaped.

Among dropsies, HYDROCEPHALUS is the most frequent, but not the only, form met. The fluid distends the ventricles, and, as a result, there is expansion and thinning of the cranium, the bones of which are widely spread. Ascites and hydrothorax are now and then met. The following fœtal diseases, among others, have been reported: *Pleurisy, scirrhus, tubercles, pneumonia, calcareous deposits, peritonitis, scarlatina, measles, enteritis, worms, calculus, jaundice, rickets, caries, necrosis, convulsions, hemorrhages*, etc. *Tumors* of various kinds, and in different situations, have been observed. Tarnier reported a meningocele larger than a child's head, and large cystic growths have been found attached to the nates, thorax and other parts.

The child may suffer from the effects of VIOLENCE. Extensive lacerations, and contusions in various parts of the body, have been observed. Intra-uterine fractures have resulted from injuries, but there is no doubt that spontaneous fractures do occur, and are nearly always multiple in the same fœtus. Chaussier speaks of a child born in 1803, after a rapid and easy labor, who had forty-three fractures, even the cranial bones being involved. He also reports a case in which a child was born after an extremely short and easy labor, presenting feeble signs of life, and living but a short time, upon whom were found one hundred and thirteen fractures. The causes of such anomalies are not well understood, but are supposed to be due to arrested development of the bony structures.

INTRA-UTERINE AMPUTATIONS.—Another phenomenon equally remarkable, is that of amputation of fœtal extremities. Numerous cases of limbs deprived of a portion of their continuity have been reported, in which the stump presented evidences of traumatism. Medical records show cases in which the whole four extremities were wanting, as shown in figure 116.

The cause of these conditions merits much attention. Such amputations are commonly explained by assuming that they are the results of gangrene; but Reuss holds a different view. It does seem that the gangrene theory is untenable, inas-

much as such a degenerative change cannot take place in the absence of atmospheric air, though there may be an equally destructive process.

A certain number of these amputations probably result from coiling of the cord about the extremities; and another of the most common causes is the constriction of fibrous bands or folds of the amnion. But in many instances none of these causes have been at work, and hence their etiology is shrouded in obscurity.



FIG. 116.—Intra-uterine Amputations.

Fœtuses who suffer intra-uterine amputation are usually still-born.

The amputated part is sometimes found lying in the amniotic cavity, and follows the child in delivery. More frequently the amputated portion disintegrates and disappears. But this can occur only when amputation has taken place at an early period of development. When separation is effected at a later period, the part is not only found, but cicatrization of the stump is often incomplete. Rudimentary toes are found on the stump, which are believed by some to be abortive attempts of nature at reproduction of the lost parts.

Monstrosities.—Deviation from the ordinary process of development results in the production of monsters. The subject is one which might very properly here be considered at length, but it is so extensive that we shall attempt to give only its outlines.

Our observation in this direction has been very limited, and we follow Charpentier, who, in turn, quotes mainly from Saint-Hilaire.

Monsters are divided into two grand classes, namely, simple and composite; the former being made up of elements of a single fœtus, and the latter of elements of more than one.

SIMPLE MONSTERS.—In these there is either absence of individual elements, or unnatural distribution of them. They have been divided into three varieties, namely, autosites, omphalosites and parasites. The first are capable of sustaining life for a time after birth; the second can live only in the uterus; and the third are morbid productions, having their seat either in the uterus or ovaries.

Autosites have been divided again into varieties according to the character and seat of the abnormal development. Ectromelic fœtuses are such as lack one or more limbs, but do not include cases of intra-uterine amputation. Phocomeles are those wherein atrophy is limited to the middle segments of the limbs, the feet and hands being well developed. Hemimeles are fœtuses with rudimentary feet, hands, and forearms or legs. Ectromeles are those wherein arrested development includes all the segments to about an equal degree. In symmelic fœtuses there is a union of two limbs of the same kind. They are symmelic when the fused legs have only one foot. Sirenomeles are where the fused limbs terminate in a point without a foot. Celosomic fœtuses have more or less complex eventration of the genito-urinary organs and various viscera. These are given various names according to the character of the abnormality.



FIG. 117.—Acephalic Fœtus.

Exencephalic fœtuses are characterized by badly formed brains which are only partly enclosed by the skull. They are divided into notencephalic, proencephalic, podencephalic, hyperencephalic, iniencephalic. Exencephalic fœtuses are characterized by the presence of the brain almost entirely outside the skull. Pseudencephalic fœtuses are entirely wanting in brain matter. The vault of the skull is absent. The superimposed mass is small, of a deep red color, provided with interlacing vessels, separated only by débris of brain matter. Anencephalic fœtuses differ from the last named mainly in the absence

of the fungoid tumor. There is arrest of development throughout the entire vertebral canal. Derencephalic fœtuses differ from the anencephalic in the absence of so extensive a fissure of the vertebral canal.

Cyclocephalic fœtuses are anomalous in the absence of nasal appendages, and in misshaped eyes. These are often associated with other abnormalities. Five varieties have been described: ethnocephalic, cebocephalic, rhinocephalic, cyclocephalic (true), stomocephalic.

Octocephalic fœtuses.—These are derivatives of the cyclocephalic, with more marked tendency to atrophy. Their most characteristic feature is an approximation of the ears. Five varieties are described: sphenocephalic, octocephalic, edocephalic, opocephalic and triocephalic.

Omphalosites.—There are many varieties of these, and, in view of their variety, but a brief mention will be made of them. Paracephalic fœtuses are those in which the characteristic feature is the head, which is only a mass at the upper part of the trunk. Acephalic fœtuses have no head, but a mere anatomical trace of it. Anidic fœtuses have sometimes been called acardiac. They constitute almost an indeterminate mass of varying form. They are termed parasitic.

COMPOSITE MONSTERS.—There are many varieties of these. They are twins practically complete, with separate organic action, but with united bodies. When joined back to back, they are called pygopagi; when united by the heads and look in the same direction, they are termed metopagi; and when joined head to head, but facing in opposite directions, they are known as cephalopagi. Monomphalic fœtuses are united at the trunkal surfaces, and present the following varieties: xiphopage, sternopage, ectopage and hemipage.

Sycephalic Fœtuses.—In these there is fusion of the heads. They are always of the same sex. Following are the varieties: janiceps, myopes and synotes.

Monocephalic Fœtuses are those in which one head, without trace of union, surmounts two bodies.

Deradelphe.—In these the bodies are united above the umbilicus, and separated below. If there are four pelvic limbs and two thoracic, the monstrosity is termed thoradelphe. Iliodelphe are those with one head and neck, two thoracic limbs, one body below the umbilicus, and four pelvic limbs. Synadelphe are those with one head, single trunk, four arms and four legs.

Sysomic Fœtuses.—In these there is fusion of the two trunks, but the heads are not involved. Psodymes have a single pelvis and two lower limbs. Xyphodymes have a fusion involving likewise the lower part of the thorax. In derodymes fusion of the bodies is throughout the entire length.

Monosomic Fœtuses.—In these there are two heads upon a single body. The varieties are, atlodymes, miodymes and opodymes.

COMPLEX PARASITIC MONSTROSITIES.—Here there is fusion of two beings, but one has undergone such arrest of development that it could not sustain independent existence. They are exceedingly rare in the human species, and do not deserve extensive mention in a work of this character. Among the varieties are heteropage, heterodelph, heterodyne, heterolicus, polygnathus, epignathus, hypognathus, augnathus, pygomelus, gastromelus, cephalomelus and melomelus.



FIG. 118.—Pygopagi. (Charpentier.)

DEATH AND RETENTION OF THE FŒTUS.—Expulsion of the fœtus does not, in all cases, immediately follow death. If the placenta does not separate from the uterus, its vitality may remain, its development continue, and expulsion thus be delayed. When the placenta does become separated, whether as cause or effect of fœtal death, retention is probably due to diminished irritability of the reflex nervous centers which preside over the uterine energies. Retention due to uninterrupted utero-placental relations, is rarely prolonged beyond the ordinary period of utero-gestation, while retention referable to diminished reflex irritability may be indefinitely protracted.



FIGS. 119 AND 120.—Monosomata. (Charpentier.)

When the fœtus is retained, and the membranes continue intact, the most important changes are mummification, maceration, and calcification. If the membranes are broken before or soon after fœtal death, mummification may result, or calcareous degeneration follow. If air gains entrance into the uterine cavity, putrefactive changes are apt to take place. Mummification having begun, putrefaction does not set in.

Putrefaction.—This cannot take place unless air finds entrance to the uterine cavity. The conditions then met are those most favorable to its development, namely, moisture and heat. It often proceeds with great rapidity, so that surprising changes occur within a few hours. McClintock says he has observed the abdomen become quite tympanitic before delivery in cases where death did not occur until after the beginning of labor. The changes resemble those which take place in the body of a person who has drowned: i. e., the abdomen swells with gas, the deeper tissues of the body become œdematous, the emphysematous connective tissue crepitates when pinched, and a horrible odor is emitted from the body. Sometimes the uterus becomes distended by the gas generated in the process of decomposition, emitting it at intervals, which condition is known as *physometra*. The woman suffers chilliness, elevated temperature, and a sense of general illness, and, unless relieved from the source of infection, the process may terminate in death.

Mummification.—It becomes necessary to explain what is meant by mummification, and what are its causes. "At the second period of intra-uterine life is a particular change, entirely distinct in form from those which precede or which follow. The embryo, endowed with greater force of resistance, provided with an osseous frame, frail and incomplete, it is true, but nevertheless solid, composed of newly organized elements, which already have a fixed texture, does not liquefy; it preserves its first form, except its volume, which suffers a proportional reduction. This is mummification, withering, emaciation, contraction, drying up of the authors. The tissues, yet soft, are condensed under the influence of the prolonged maceration in a saline fluid; they are diminished in volume, reduced to a thinner layer, in a word, shrivelled up. The color also changes very rapidly; it becomes dull, gray, yellowish, tarnished, and as if cachectic, contrasting clearly with the normal color, a brilliant dark rose. The quantity of sanguineous fluid exuded into the

different serous cavities is very small, very dark, and the rose color of the eye-humors hardly marked."

It is most frequently observed in fœtuses with inadequate blood-supply, a condition growing out of constriction of the umbilical cord. From preference, it attacks those dying during the middle stages of gestation, and especially a single fœtus in twin pregnancy. When one mummified and one living fœtus occupy the uterine cavity, gestation usually preserves a tolerably normal course and expulsion of the living and the dead is deferred until the close of the ordinary period of utero-gestation.

Maceration.—This is a process of slow decomposition, and by it an embryo may be entirely dissolved. A fœtus, on the contrary, preserves the outline of its organs and general form, but granular degeneration and disintegration of its anatomical elements takes place. The epidermis first yields to the process. It rises in the form of blebs or vesicles, which fill with a reddish, sero-sanguinolent, or clear serous fluid. There is also infiltration of the corium, which has a brownish-red appearance resembling the lees of wine. The subcutaneous areolar and adipose tissues are also œdematous. There is no odor, no gas, no cadaveric tint, and the process never gives rise to septic symptoms in the mother. Viewing the body as a whole, it is observed to be flaccid, and, from its œdematous condition, may be molded by pressure into grotesque shapes. Œdema is most apparent over the cranium, abdomen, feet, hands and sternum. The cranial sutures are separated, the articular surfaces pushed apart, and the periosteum is detached from the long bones. Dark blood is found in the vessels, and bloody serum in the serous cavities. The brain is pulpified, and all the viscera are softened.

MOLES.—Of these, one variety—the hydatidiform—has already been described, and of the other varieties, but a brief consideration will be required. Moles have been divided into two general classes, one of which is termed *false*, and the other *true*, the element of distinction between them being that the true mole is always consecutive on impregnation, and the false is not. Hence, in a work of this character and scope, we shall consider the former class only.

True moles are divided into three general varieties, namely: 1. The mole of abortion, or the blighted ovum. 2. The carneous, or fleshy mole; and 3. The hydatidiform mole. The last of these having been described, the first two varieties only remain for consideration.

The Mole of Abortion, or mola sanguinosa, is the blighted ovum, within which post-mortem changes have just begun, and the mass has not yet been materially altered, save in the direction of extravasation of blood and dissolution of the embryo, whose vital resistance, until death, had been sufficiently potent to preserve its integrity. Many years ago Smellie took occasion to say that "should the embryo die (suppose in the first or second month), some days before the ovum is discharged, it will sometimes be entirely dissolved, so that when the secundines are delivered there's nothing more to be seen. In the first month the embryo is so small and tender that the dissolution will be performed in twelve hours; in the second month, two, three, or four days will suffice for this purpose." In case fœtal death occurs in more advanced pregnancy, degenerative and disintegrative changes are wrought in a relatively short period, and the mass, when expelled, may not disclose its real character except to closest scrutiny.

The Fleshy Mole.—The conditions which give rise to the formation of the carneous mole are substantially as follow: As the result of some sudden or violent exertion, one or more blood-vessels give way, and as the blood is extravasated, it acts in a mechanical way to influence separation of contiguous parts, with most potent results. The embryo perishes from want of nutritive supplies. A similar effect may be produced by apoplexy of the placenta, elsewhere considered. Extravasation is sometimes between the chorion and decidua, and even within the amniotic cavity, and results in embryonic death.

Consecutive on such occurrences there is, most frequently, speedy expulsion of the ovum, but occasionally it remains for a considerable time, and undergoes certain changes by which it is converted into a fleshy mass. The effused blood becomes decolorized, the blanching proceeding from center to circumference, and, according to Scanzoni, the fibrin is transformed into cellular tissue, by which means communication is established between the external lining of the ovum and the uterine tissues,—and thus further development is made possible. It is highly probable that complete separation of the ovum from the uterus never takes place in these cases, but, through the adherent parts, vascular communication is continued and amplified. Degenerative changes take place chiefly in the decidua vera, though the chorion and amnion are sometimes more or less involved.

These masses seldom exceed an orange in size, but their full

development, from the very nature of the case, is quite rapidly accomplished. They may continue in utero for three or four months, but eventually the organ is excited to contraction, and expulsion takes place, unattended, as a rule, by any remarkable symptoms.

Little need be said with reference to the treatment of such cases. There are a few remedies which have the reputation of promoting the expulsion of moles, but whether the reputation has been fairly earned is a matter which we have not thus far been able to determine. The truth is, that, apart from the hydatidiform mole, which was previously considered, these degenerate products of conception are not often recognized, and hence women who are the subjects of them rarely fall under treatment until the process of expulsion is well under way. When uterine efforts at expulsion have once strongly set in, the form of promotive treatment, described under the head of abortion, is then applicable. We should use such means, whether they be fingers, instruments or drugs, as will safely hasten the process. For specific indications we refer to the chapter on abortion. If, from the symptoms, we should be led to believe that the uterus contains a mole, we may safely, and effectually, resort to such remedies as *calcarea carb., silicea, sulphur, sepia, caulophyllum, sabina, secale,* and sometimes others, according to specific indications.

CHAPTER X.

DISEASES AND ACCIDENTS OF PREGNANCY.

When we reflect upon the profound impressions made on the female organism, and the extensive changes wrought in it by pregnancy; and furthermore, when we recollect that this condition exempts a woman from few of the ordinary ills of life, we shall cease to wonder that there is a pathological, as well as psychological, side to the subject.

The Hygiene of Pregnancy.—At the risk of transposing the conventional order of discussing pathological states, we have chosen, at this point, to offer a few observations on the general management of pregnant women.

The general health is frequently already disturbed, and the system in an enfeebled state, when pregnancy is established. The woman at once enters on the trying experiences of early gestation, and, attributing nearly all her symptoms to the physiological changes being wrought in her organism, viewing them also as in great measure essential features of her condition, she is prone to neglect proper attention to hygienic rules. Though the advent of pregnancy find her in excellent health, she is extremely liable, while under the influence of subsequent ill-feeling, to neglect proper precaution in the way of attention to sanitary details which would materially mitigate existing suffering, and aid in preparing her for an easy and safe termination of gestation.

We have seen many women so overcome by the nervous disturbances and gastric ailments of the early part of pregnancy, as to seek close confinement at home, and sometimes even to take to their beds. This, of course, is altogether wrong. At that very time, fresh air and moderate exercise are of the greatest value. Those who spend their days mainly in the open air, and their nights in well-ventilated rooms, are tided over the distressful weeks of pregnancy in greater comfort than those who pay no regard to such sanitary essentials. Throughout pregnancy a woman ought to spend as much of her time in the open air, without walking or riding to the extent of producing excessive fatigue, as the condition of the weather will permit. The health and strength of both mother and child are greatly promoted by so doing.

The diet should be regulated to suit the peculiar requirements and sensibilities of the woman, and ought to embrace most nutritious and easily-digested articles of food. It is not our purpose to give a complete bill of fare, but to indicate certain articles which most commonly agree with the requirements and the peculiar sensibilities of women under these trying circumstances. Patients are differently constituted, and have been so variously trained with respect to gastronomics, that many will prove heedless of our best advice, even though made emphatic. Some of them assume that it is a matter of no consequence what they eat, while others have derived from their friends or relatives certain harmful notions which they do not care to give up.

Certain articles of food are peculiarly suited to the conditions which prevail in the early part of pregnancy which would be liable to disagree in late gestation. In the early weeks the gastric symptoms are chiefly nausea and vomiting; while in the latter weeks they are mainly those growing out of compression and a changed character of the gastric secretions. During the early period, unless the stomach is unusually sensitive, women may choose their food from among the following articles: mutton-broth, chicken-broth, oysters, clams and fish. When they have theretofore agreed, the following may also be eaten: beef, mutton, chicken, game, eggs, stale bread, oat meal, rice, baked potatoes, spinach, macaroni, greens, celery, green peas, lettuce, asparagus, oranges, grapes, and stewed fruit. Desserts should, in most instances, be avoided.

There are doubtless many harmless things not included in this list, while, on the other hand, many of those which do appear will not in all cases prove innocuous. In late pregnancy, as we have before said, compression and a changed character of the secretions constitute the most distressing factors of the gastric symptoms, and the diet should be modified to meet existing conditions. Very likely the upward pressure of the enlarged uterus, in interfering with proper action of the stomach, and sometimes even changing its form, has much to do with the woman's discomfort. But even here, careful attention to diet will go a long way towards relief. At this period, all articles of food which will increase the fermentative action so easily set up, ought to be avoided. Such are mainly those containing starch, sugar and fat. Some patients derive considerable benefit from indulgence in lettuce. Aërated bread, in

preference to all other, ought to be eaten. In considering various pathological states to which the pregnant woman is liable, we may have occasion to say something further on this subject.

The pregnant woman requires not only an abundance of fresh air and good food, but also a certain amount of physical exercise. It must not be violent, nor carried to the production of excessive fatigue, as thus only shall we build up rather than destroy the best effects. Walking in the open air and riding in an easy vehicle, are conducive to good digestion and refreshing sleep. Although it is not commonly recommended, we truly believe, that carefully regulated calisthenics are decidedly beneficial. These ought to include breathing exercises, in which abdominal respiration is employed but not overdone. In this way all the muscles of the body can be invigorated and prepared to do good service in the propulsive efforts of labor. By abdominal respiration the abdominal muscles are given strength and tone which they will not otherwise acquire,—an important consideration, as we can see when we recall the part these structures play in the propulsive act. In women who have menstruated with regularity, it is well to regulate physical exercise so that it will not be excessive at what would be the menstrual period but for the interruption occasioned by pregnancy. This precaution derives special emphasis from the peculiar proneness to miscarriage at the completion of monthly cycles.

Sexual indulgence, always moderate, ought, during pregnancy, to be interdicted at the recurrence of these periods.

The free but judicious use of water is beneficial. Frequent sponge baths, followed by brisk rubbing, contribute to the vigor and tone of the general system. They should be taken in a warm room, and, in case of feeble women, ought to be given by an attendant. The vaginal douche may be employed, but the stream should be feeble and the quantity of water moderate.

The mind of the pregnant woman deserves even more attention than the body. It is highly important that her surroundings be of the most agreeable nature, and the mind thus maintained in the greatest possible state of tranquillity. When left to herself she is very apt to fall into morbid moods, and, at times, to suffer distressing mental perturbation. It lies upon the physician and the friends of the woman, as an obligation,

to show her the bright side of life, and to maintain a cheerful and hopeful spirit. Primigravidæ are often astonished to find labor so painful. It is to them a revelation, but a revelation which should not be made in advance. "Sufficient unto the day is the evil thereof." It is far better to fill the mind of the pregnant woman with bright images and agreeable prospects, since by such management the tedium of gestation becomes far more bearable, and the outcome much less distressful. If possible, prevent her from being brought into contact with women who take exquisite delight in harrowing the souls of unsophisticated young married women just entering upon maternity with a recital of the perils and suffering which await them at parturition. If despite the most judicious management our patients in early and middle pregnancy do become depressed and disheartened, they may be indulged in a pleasant trip by rail or other easy conveyance, to home or friends, and thereby, for a time, be gotten out of the monotonous cycles of ordinary domestic life.

The entire period of utero-gestation to some women is one of physical and mental distress, and from it they finally emerge with a sense of joy akin to that experienced by the prisoner who is set free after long confinement. The ailments from which they suffer are various, oftentimes relievable by medication, or a change of scenery; while in certain instances they cannot be made to give way, though every intelligent effort be put forth to subdue them.

Urinary Tests.—At varying intervals in the latter part of pregnancy careful tests of the urine ought to be made, both as to quantity and constituents. Diminution of the diurnal excretion usually precedes albuminuria. Various conditions, among which are atmospheric temperature and the amount of fluids drunk, have an important bearing on the quantity of urine voided, and these should be given due consideration. The presence of any albumen, or a diminution of the quantity of urea much below 500 grains, in a woman weighing 140 pounds, should be regarded with suspicion.

Derangements of the Digestive System.—The most prominent derangements of the digestive functions, referable chiefly to sympathetic irritation, are NAUSEA AND VOMITING. They are the common accompaniments of pregnancy, and under ordinary circumstances can hardly be considered as ailments requiring medical attention; but occasionally they are so ex-

cessive and long continued as to lead to inanition, extreme debility, and even death. Veit attributes the uncontrollable vomiting of pregnancy in many cases to endometritis. In some cases the sickness is limited to the morning hours, at which time the smallest quantity of food is rejected, while later in the day it may be borne with impunity. From these circumstances the nausea and vomiting of pregnancy have been designated "morning sickness." In other cases, the woman feels constantly sick, and the mere smell of food may bring on a paroxysm of vomiting.

These distressing accompaniments of pregnancy are not experienced by all women, but about forty per cent. of them escape such disturbance altogether. They usually begin about the sixth week, and continue till the close of the third month. Sometimes, however, they immediately follow conception, and continue until the end of pregnancy, while in other women they do not appear until the patient has reached the latter months of gestation.

It is surprising to observe how severe and protracted may be such gastric disturbances in some cases without producing emaciation or excessive debility, while in other instances the vital forces are thereby brought to a low ebb. Grave cases are characterized by a dry coated tongue, pallor and distress of countenance, excessive nervous irritability, tenderness of the epigastrium, great restlessness, and general heat. In worse cases there is elevated temperature, with rapid, small and thready pulse. Want of nourishment soon reduces the woman to a state of extreme emaciation. The breath becomes fœtid, and the tongue dry and black. Profound exhaustion, with low delirium, follows, and, in the absence of relief, death soon ensues.

The prognosis in nausea and vomiting of pregnancy, though the affection should assume a grave form, is generally hopeful; but such cases create much anxiety. Gueniot collected 118 cases of this form of the disease, out of which forty-six died; and out of the seventy-two who recovered, in forty-two the symptoms ceased only when abortion, either spontaneously or artificially induced, had occurred. Upon the termination of pregnancy the symptoms sometimes at once disappear, and the digestive and assimilative processes soon become active and vigorous.

TREATMENT.—It is of prime importance to regulate the diet

of women suffering from morning sickness. A few mouthfuls of food, or a cup of coffee, taken in the morning before rising, many times proves of decided benefit. Food should be taken in small quantities and at short intervals. Ice cream thus eaten will sometimes be retained when nothing else can be. Koumyss, when fancied by the patient, is a remarkably good food. Special articles can be selected from the list given under the head of the Hygiene of Pregnancy. The woman's caprices should be considered in the choice of food, but should not be allowed to betray one into injudicious selections. The bowels ought, throughout pregnancy, to be kept open.

In some cases, where other forms of treatment prove unavailing, and the patients are greatly reduced, a change of habitation, air and scenery, especially from a poorly ventilated house in the crowded part of the city to a rural situation, is of the greatest benefit.

Since it is clear that the nausea and vomiting of pregnancy are mainly dependent upon changes going on in and about the uterus, the attempt has been made to reduce the irritability of the organ by local treatment. Morphia, in the form of suppositories, and belladonna applications to the cervix, have been recommended, the former being in some cases of apparent benefit. The cervix has been burned with caustic, and bitten by leeches, in the vain endeavor to overcome the obstinate sickness. In the latter months, gentle dilatation of the cervical canal to a slight degree only, has been attended with beneficial results. Dr. Grailey Hewitt believes that in quite a large percentage of cases the disorder depends on uterine deviations, and can be cured only by their rectification. This may be true and the suggestion should lead to a careful examination in all obstinate cases. If retroverted, a Hodge, or an Albert Smith pessary, properly adjusted, can be safely worn. During the employment of local treatment a woman should be required to rest more than usual in the reclining posture.

Galvanism, in some cases, has afforded relief to distressing nausea and vomiting. The current ought not to be directed through the uterus, but one pole may lie on the epigastrium and the other on the nape of the neck.

Ether spray upon the epigastrium will in some instances decidedly allay these distressing symptoms.

Production of vesication over the fourth and fifth dorsal vertebræ will often afford great relief. The same may be said

of the glycerine tampon, and of the well-fitted abdominal supporter.

The list of remedies which may be found useful in this condition is long, but there are a few especially prominent.

Ipecac should be given when the nausea is the predominant symptom attended with vomiting of bilious matters, undigested food, and large quantities of mucus.

Arsenicum, when the vomiting occurs after eating and drinking, and there is faintness, and excessive prostration of the vital forces.

Nux vomica, for real morning sickness; bitter, sour eructations; vomiting of sour mucus and the ingesta. Also, for excessive nausea, with the feeling that she would be better if she could vomit.

Tabacum, in those cases where there is nausea, with faintness and deathly pallor, relieved by being in the open air. Vomiting of water, acid fluid and mucus.

Psorinum is suited to obstinate cases, especially in women presenting the psoric diathesis.

Pulsatilla, especially when the vomiting comes on in the evening or night. The appetite is capricious, the woman craving beer, acids, wines, etc. Much eructation tasting of the ingesta. Specially suited to mild, tearful women.

Acetic acid, when there is sour belching and vomiting, with profuse water-brash and salivation.

Colchicum, when the following symptom is well marked: excessive nausea, even to faintness, produced by the odor of fish, eggs, meat, etc.

Bryonia, when the nausea and vomiting are brought on or decidedly aggravated by the least motion. *Veratrum album* is well suited to the same symptom.

Phosphoric acid, a few drops of the dilute acid in a half glass of water, and a teaspoonful every two hours, is often of the greatest service. Its special indications correspond pretty closely with those given above for acetic acid.

Sulphur.—Nausea, without vomiting, with faint sickish spells during the forenoon.

Almost every remedy in the materia medica has been recommended, and we doubt not that there are cases to which they are severally suited.

HYPEREMESIS.—When the vomiting is absolutely uncontrollable—as it will rarely prove to be when the patient fully

co-operates with her physician in the effort at cure—and fatal results seem imminent, there remains as an ultimate resource, the artificial interruption of pregnancy. In considering this expedient regard should be had for the clinical fact that, in most instances, the threatening symptoms disappear at about the close of the third month. It is an operation which is liable to subject the physician to criticism, and, as it is attended with considerable risk, it should never be undertaken upon the responsibility of a single attendant.

There seems to be no doubt that some mothers have been saved by the induction of abortion in such cases, in all probability many have been lost for want of it, while some probably owe their death to it. The success of the operation demands that it be performed before prostration has become so great that the patient cannot rally. The obvious indication is to diminish uterine tension, without delay, and the preferable mode of doing this is to puncture the membranes with a uterine sound or stiff catheter, and allow the amniotic fluid to escape.

Prof. C. Braun, of Vienna, reports a case of hyperemesis to which he was called, in which the woman was supposed to be moribund. The physician in charge had resolved on the induction of premature labor as a last resort. Dr. Braun decided to bathe the intra-vaginal portion of the cervix in a ten per cent. solution of nitrate of silver. This was done and the surface quickly dried to prevent further cauterization. An hour afterwards the patient enjoyed and retained a meal of roast beef and there was no subsequent vomiting.

Braun says he has never, in all his vast obstetrical practice, seen a case of death from hyperemesis. In an obstetrical experience extending over a period of fourteen years, we have never seen a case in which the symptoms became so uncontrollable as to cause us seriously to think of this operation. Furthermore, we believe that homeopathic literature will show very few cases wherein the induction of abortion became necessary in order to control nausea and vomiting. In France, where abortion is frequently induced for the relief of these symptoms, the vomiting is arrested in only about forty per cent. of all cases, while ten per cent. of them terminate fatally.

Other Gastric Disorders.—Anorexia, or want of appetite, and even a loathing and disgust for food, is a prominent disorder of the stomach, especially during the early months of gestation, but, under the influence of gentle exercise, pure air,

salubrious surroundings, and judicious selection of food, it will generally disappear. The remedies which are most likely to afford aid are the following:

Nux vomica, when there is irritability of temper; exceeding sensitiveness to every impression, and constipation with frequent ineffectual urging to stool.

Ipecac when associated with distressing nausea, with, or without, vomiting.

Antimonium tartaricum affords help when there are vomiting of mucus, sense of weakness, bad humor and pale face.

Antimonium crudem is the remedy when there are white tongue, unusual activity of the muciparous glands in various parts, and no thirst. This remedy is pre-eminently suited to women who have gastric catarrh.

Colchicum, with its strong characteristic of extreme aversion to the odor, or even the mention, of food, is an excellent remedy. There is no thirst

Other remedies are *natrum muriaticum, china, pulsatilla* and *cyclamen.*

The patient may be annoyed also with acidity of the stomach and heartburn, for which *nux vomica, calcarea, natrum muriaticum, sulphur,* or *phosphoric acid* is likely to prove efficacious. We have oftener obtained relief from *arsenicum jod.* than any other remedy. Temporary relief will often be afforded by a swallow of pure glycerine, or a half-teaspoonful dose of aromatic spirits of ammonia. Flatulent distension may be removed by *carbo veg., china, lycopodium, nux vomica* or *argentum nitricum.*

Neuralgia of the stomach is sometimes very distressing. If attended with nausea, *ipecac* will often relieve; if of a cramping nature, *nux vomica;* if the stomach feels as though distended with gas, *carbo veg., belladonna,* or better still, *atropin sulph.,* is often of service. Hot fomentations should be applied to the epigastrium.

The caprices of appetite, so often met, seldom require medication, but may serve as valuable indications for the selection of remedies in the treatment of other morbid conditions.

To enable the practitioner to select the indicated remedy with greater precision, we have adapted from Dr. George W. Winterburn's repertory the following:

GASTRIC AILMENTS.

Acidity, clc. pul. chin. nux. phos. sul. crb. arn. chm. ly. kli-c. nit-a. stm. nat-m. fer. sul-a. ph-a. tart. pet. io. grph. ip. lach. bell. amb.
Diarrhœa, *with*, ars. ip. ver. phos. lach. bell, tart. col.
Drinking, *after*, ars. ver. pul. sil. bry. nux. arn. chin. fer. rhs. chm. ac.
Eating, *after*, ars. bry. clc. cyc. dig. lach. merc. nat-m. nux phos. pul. sil. sul. ver. crb. ammc. con. fer. hyo. ly. sep. nit-a. zn. stm. pet. nat-c. kli-c. io. grph, chm. an.
— *during*, pul. kli-c. merc. ver. fer. crb. dig. mag-m. sar.
— — *relieves*, sep. phos. saba.
Eructations, nat-m. crb. bry. an-t. nux. hep. con. arn. sul. thj. stm. verb. chin. alu. ver. bell. kli-c. merc. mur-a. sep. sta. pet. grph. caus.
— *bitter*, nux. an-t. sep. chin. pul. arn. bell. ver. scil. gra. merc. sul-a. thj. bry.
— *burning*, io. ph-a. cth.
— *constant*, lach. sul. con.
— *empty*, sul. con. bry. hep. crb. nux. lach. caus. phos. sep. ver. ammc. bell. sta. merc. kli-c. nat-c. rhs. ru. sab.
— *fetid*, sul.
— *food, tasting of*, pul. crb. sil. an-t. con. phos. ammc. chin. amb. thj. nat-m. ly. chel.
— *greasy*, crb.
— *ineffectual*, phos. caus. con. amb. sul. crb. pul.
— *loud, belching*, con. pet.
— *nauseous*, sep. cin.
— *painful*, phos. sep. pet. cocc. saba. crb-a.
— *putrid*, merc. nux.
— *rancid*, thj.
— *relieves*, lach.
— *salt*, sta.
— *sour*, sul-a. nat-m. chm. crb. alu. nux. ly. phos. amb. pul. kli-c. ph-a. zn. io. asa. chin.
Eructations accompanied by *breathing impeded*, gra.
— *chest pain.* zn.
— *colic*, chm.
— *hawking*, cup.
— *improvement*, lach.
— *nausea*, cocc.
— *stomach-ache*, phos.
— *throat constricted*, nux. caus.
Eructations occurring,
— *drinking, after*, tar. ars. mez.
— *eating, when*, nat-c. pet. ol. sar.
— — *after*, nat-m. bry. chin. ars. crb. ver. phos. lach. merc. nux. sil. clc. thj. sul.
— — — *fat*, crb.
— — — *meat*, ru.
— *hysteric persons*, ru.
— *milk, after*, nat-m. sul. chin. zn.
— *morning, early*, val. crc.
— *night*, lach. sul.
— *smoking*, sel.
Evening, *in*, pul. phos. cyc. an. sil.
Fat, *from*, pul. crb-a. sep. drs. cyc. thj. nit-a.
Heartburn, clc. sul-a. cap. nat-m. am-c. saba. zn. amb. io. ly. crc.
Heartburn, *continually*, lob.
— *meals, during*, merc.
— *sugar, from*, zn.
Hiccough, ign. ac. str. hyo. nux. pul. sul. bov. bell. bry. am-m. mag-m. nux-m. sep. coff. clc. ars. cup. mur-a. nit-a. ver. grph. merc.
— *painful*, teu.
— *spasmodic*, nux. str. bell.
— *violent*, nux. ly. cic.
Hiccough occurring,
— *breakfast, after*, zn.
— *drinking, after*, lach.
— *eating, while*, merc. teu.
— — *after*, ver. hyo. cyc. merc.
— *evening, in*, sil.
— *motion, causes*, crb.
— *night*, ars.
Loathing, gra. sen. rat. mag-c. sec. lau. asa.
— *beer, after*, mur-a. nux.

Loathing—*Continued.*
— *meals, after*, ip. sars.
— *night*, rat.
Milk, *from*, clc. sul.
Morning, *early in*, dig. sul. sil. nux. grph. an. crb. arn. kr. bar. ly. phos. chm. lach.
Mucous *disorders*, pul. sng. chin. merc. sul. cap. bell. ip. ver. rhs.
Nausea, ip. an-t. nux. tart. sul. nat-m. hep. crb. sil. ver. ign. grph. an. caus. phos. sta. alu. arn. bell. bry. chin. dig. lach. merc. ph-a. ru. sep. stm. sul-a. sec. nit-a. pet. kli. cup. amb. bar. kr.
— *afternoon, in*, ran.
— *air, in*, ang. bell.
— — *relieved*, ly.
— *breakfast, after*, chm.
— — *before*, ip.
— *coffee, after*, chm. cap.
— *cold, effects of*, cocc.
— *constant, frequent*, ip. nux. crb. sil. ly. nat-c. kli. ver. scil. mag-m. ph-a.
— *drinking, when*, nux.
— — *relieves*, phos.
— — *eating, after*, nux. pul. sul. ver. sep. rhs. grph. phos. nat-m. cyc. ars. chm.
— — *when*, kli. ver. pul. fer. crb. cocc.
— — *relieves*, sep. kli. phos.
— *eggs, odor of*, clch.
— *evening, in*, pul. cyc.
— *eyes, when closing*, ther.
— *fat, causes*, pul. crb-a. drs. sep.
— — *as from*, cyc. tar.
— *injuries, after*, rhs. bry. arn. pul. chel.
— *milk, from*, clc.
— *morning, early*, ip. nux. sil. an. ver. grph. crb. arn. dig. kli. sep. phos.
— *motion*, ars. pul. kli. crb-a.
— *noise, fright*, ther. ign.
— *riding, from*, cocc. pet. sul. nux-m. sep. sta.
— *spitting, when*, led.

Nausea—*Continued.*
— *throat, felt in*, ph-a.
— *walking, when*, kli.
— — *in air*, alu.
— *wine, from*, an-t.
Nausea accompanied by,
— *anguish*, kli-c. ign.
— *backache*, pul.
— *bitterness in mouth*, bell.
— *chilliness*, sng. pul. kr.
— *colic*, pul. cup.
— *dyspnœa*, sng.
— *ears, humming in*, ac.
— *eructations*, cocc. ac. spig.
— *face, pale*, pul.
— — *gray*, mag-m.
— — *hot*, sng.
— — *red*, ver.
— *fainting*, arn. bov. ly.
— *hunger*, spig. mag-m.
— *loathing of food, with*, bell. hell. lau.
— *lying down, when*, ars. ph-a.
— *thirst*, ver.
— *water in mouth, flow of*, pet.
Night, *at*, ars. rhs. sul. chin. phos. nux.
Regurgitation, *food*, crb. phos. nux. lach. sul. ly. bry. tart. clc. grph. pul. sars. sul-a. zn. bell. ign. hep. merc.
— *acrid*, can. ars. tart.
— *bitter*, arn. sars. gra. nux. te
— *bloody*, nux.
— *drinks, of*, sul.
— *food, of digested*, phos. sul. ly. chm. bry. ign. lach. con. thj. fer. nux. mag-m. cth.
— *green substance*, ars. grph.
— *milk, of*, ly. tart.
— *rancid*, merc.
— *salty*, sul-a.
— *slimy*, arn.
— *sour*, phos. sul. grph. ly. nat-m.
— *sweetish*, ac. plb.
— *watery*, plb. gra.
— *yellow substance*, cic.
Regurgitation occurring,
— *drinking, after*, merc.
— — *milk*, clc. crb. ly.

Regurgitation occurring—*Continued.*
— *eating*, lach. ver. bry. nux. sars. asa. fer.
— *night*, cth.
— *stooping, when*, cic.
— *walking*, mag-m.
Retching, ip. bell. nux. arn. stm. merc. plb. bry. asa. tart. op. saba. zn. nat-m.
— *bread causes*, chin. nit-a.
Riding, *swinging*, cocc. pet. fer. bor. clch. sil. ly. sul.
Sour *food causes*, crb. ac. ars. hep. lach. sul. nat-m.
Sweets, merc. zn. ac.
Vomiting, ars. ip. pul. nux. ver. chm. arn. bry. sec. sep. lach. merc. ly. caus. cin. bell. ign. kli. nat-m. nux-m. sil. tart. sul.
— *acrid*, ip.
— *albuminous*, ars. jat. ip. ver.
— *bilious*, an-t. nux. chm. pul. ars. ac. chin. bry. sep. phos. ip. cin. lach. ver. merc. drs. coff. bell. ly. sul. col. ign.
— *black*, ver. ars. chin. nux. ip. phos. clc. pet. sul. plb.
— — *stains*, ar-n.
— *bloody*, fer. ac. arn. phos. ip. pul. stm. ars. bell. clc. hyo.
— *bluish*, cup.
— brown, ars. bis.
— *drank, what has been*, ars. ver. sil. hyo. phos. ip. cin.
— *food, of*, nux. phos. sul. ars. ip. pul. sil. sep. dig. cle. bry. chm. sec. fer. grph. hyo.
— *frothy*, ver.
— *gelatinous*, ip. [ac. pet.
— *green*, ars. ver. pul. lach. plb. col.
— *mucus*, ars. jat. ip. ver.
— *milk*, sam. æt.
— *pitch-like*, ip.
— *salt*, io. sil.
— *slimy*, pul. dlc. bell. drs. sul. ip. ars. merc. an-t. chm. bor. cin. ign. gaj. cin. dig.
— *sour*, chm. phos. pul. sul. nux. ars. bell. chin. fer. tart. sul-a. caus. bor. ph-a.

Vomiting—*Continued.*
— *sweetish*, kr.
— *urinous*, op.
— *violent*, cup. lach. ver. tart. ars. nux. bell. plb. io. mos.
— *watery*, caus. drs. bry. bell. ip. jat. sul.
— *yellowish*, ars. kli.
Vomiting accompanied by
— *agony*, ars.
— *anguish*, sng. kli.
— *backache*, pul.
— *chilliness*, pul.
— *convulsions*, op. cup.
— *diarrhœa*, ars. ver. ip. bell. phos. col. lach.
— *drowsiness*, tart.
— *eructations*, mur-a. nit-a.
— *fainting*, clc.
— *fœtid breath*, ip.
— *face, pale*, pul.
— *stomach-ache*, ars. cup. nux. phos. ver. ip. dig. ac. op.
— *sweat*, ip. kli. sul.
— — *cold*, cam.
— *thirst*, ip.
— *weakness*, ver. ars. ip.
Vomiting occurring,
— *drinking, after*, chin. ver. ars. sil. fer. chm. bry. nux.
— *eating, after*, ars. phos. nux. sul. pul. fer. dig. ac. sep. arn. ver. sil. hyo. ac. ip.
— — *when*, pul. rhs.
— *evening*, pul. [mos.
— *morning, early*, nux. lach. ars. drs.
— *motion, after*, ars. bry. nux. ver. ther.
— *night, at*, pul. ars. fer. phos. nux. sul. chin. sil.
— *riding, swinging*, cocc. pet. fer. ars. clch.
— *improper food, from*, pul. ip. an-t. nux. bry. sul.
— *stooping, after*, ip.
Waking, lach.
Waterbrash, clc. sep. crb. pul. sul. nux. ars. nit-a. rhs. nat-m. bar. ip. ly. bell. pet.
— *acids, after*, phos.

Waterbrash—*Continued.*
— *alternate days*, ly.
— *drinking, after*, sep. nit-a.
— *eating, after*, sil. sul.

Waterbrash—*Continued.*
— *evening, in*, cyc.
— *morning*, sul.
— *night*, grph. crb.

STOMACH.

Aching, kli-c. ign. con. merc. bell. nux. sul. sep.
Acrid *feeling*, hep.
Alive *in, sense of something*, crc. sng.
Anguish, *with*, chm. nux. crb. spig.
— *from*, ars. chm. cup. nux. ver. coff. sec. cic. str.
Animal *fluids*, chin. crb. nux.
Anxious *feeling*, jat. ars. sec. caus. str.
Atony, *of*, bell.
Backache, *with*, bor.
Balancing, *sense of*, ph-a.
Beaten, *as if*, euph. asa.
Bending *double*, kal.
— — *relieves*, chm.
Biting *in*, mos. str.
Bitterness *in*, cup.
— *mouth*, ly.
Bloated, ars. kli. nux-m.
Boring, nat-s. sep. ars.
Bruised, *as if*, nux. asa.
Burning, ars. phos. cic. lach. nux. sep. cam. crb. sul. dig. bry. cap. euph. zn. sec. cth. merc. lau. nit-a.
— *causing hunger*, grph.
— *with vomiting*, jat.
Chagrin, chm. sta.
Chilliness, *with*, pul.
Choking, nux.
Clawing, sul-a. cocc. crb-a. nux.
Cold *feeling*, phos. rhs. chin. cap. ars. sp. clch. lau. bar.
— **drinks** *relieve*, phos.
— *from*, crb. ly. caus. sul-a.
Colic, *with*, cup. col.
— *with spasms in chest*, sep. ver.
Constriction, nux. sul. nit-a. sep. alu. plat. phos.
Corrosion, *sense of*, iod. nux.
Cramp, kli-c. an-t. grph. pul. nat-m. clc. hyo. caus. stm.
Crawling *in*, lact. pul.
Cutting, clc. nat-c.

Cutting—*Continued.*
— *towards spine*, sep.
Debility, clc-p. nat-m. saba.
Despair, *with*, an-t.
Diarrhœa, pul. stm.
Distension, ly. rat. hell.
— *before eating*, crc.
— *sense of*. mng.
Dragging *in, sense of*, merc.
Drawing *pain*, bry.
Dyspnœa, nux-m. phos. rhs. nux.
Eat, *must*, grph.
Emotions, chm. col. nux. crb.
Empty *feeling*, ign. ip.
Eructations, ars. stm. mag-c.
— *evening*, pul. sep. ly. phos. crb.
Extension, *sense of*, mng.
Fermentation, *in*, crc.
Flatulence, crb. lach. china.
Fright, *after*, crb.
Full *feeling*, kli-c, chin. nux. lach. kli. nux-m. dap. phos. sul. dig. pet. rhe. graph. bar. arn. ly. cyc. bov. cast. hell. mos. nat-s.
Fullness, *as from undigested food*, ko.
Gangrene, kli. sec.
Gastralgia, nux. crb. pul. ac. sul. cocc. bell. clc. stm. bis. amme. bry. con. ign. ly. sep. nat-c. sil. nux-m. mag-c. lach. grph. dap. chin. chm. caus. an-t. ar-n. cup. pet.
— *emotions, from*, chm. col. nux.
— *hysteric persons*, ign. gra. mag-c.
— *loss of fluids, caused*, chin. nux. crb.
— *portal congestion*, nux. crb.
— *salt, from*, crb.
Griping, sil. phos. nux. pul. nat-m. sul-a. caus. clc.
Groaning, *moaning, with*, nux. ars.
Gurgling, flu. kli-i. an. lob. verb. mens.
— *when drinking*, thj. cin. lau. cup.
Heat, *sense of*, ars. sep. chin.
— *head, with*, caus.

Hunger, stm.
Hysteric *persons*, ign. cocc. nux. mag-c.
Jumping, *sensation of*, crc.
Morning, *early*, nat-m. an. sta. nux.
Nausea, dig. ars. nux. crb. stm. nat-m. sul. ip. merc.
Night, *at*, phos. grph. nux. crb. sul. chm. ar-n.
Numb *fingers, with*, ly.
Numbness, *sense of*, cast.
Pain *in chest, with*, arn. sul.
— *stomach*, clc. nux. arn. bry. ver. spig.
Palpitations, *with*, nux. lyc.
Periodical *pain*, ly. ign. hyo.
Pressed *upon, when*, ly. bry. sil. nux. nat-m. pul.
Pressing *foot on ground, when*, bry.
Pressure, ly. nux. rhs. sep. bis. nat-m. chm. sil. pul. phos. grph. crb. bell. hep. ign. gra. cic. merc. plat. ars. bar. clc. caus. dlc. ip. lach. fer. nat-c. plb. sta. rho.
— *stone, as from*, nux. ign. chm. lach. merc. sep. spig.
Pulsation, *see* **Throbbing**.
Relaxed *feeling*, ip.
Restlessness, cth.
Rolling, *rumbling*, phos. crc. verb. hell. [caus.
Sensitiveness *to contact*, sul. nux. bry. clc. ly. lach. hep.
— *to pressure of clothing*, ly. bry. nux. clc. sul. hep. spig.
Sore, *pain as if*, nux. bry. lach.
Spasms, ang.
Stitching *in*, sep. rhs. nit-a. bry. clc. kli-c.
Stricture, *as if*, nux. phos.
Swallowing, *when*, bar.
Swelling, *sense of*, bry.
Throbbing, ol. pul. nux. asa. sep.
Touched, *when*, phos. sul. bar. nux. ars. bry. clc. nat-c. spig. merc. cup.
Twisting *sensation*, nat-m.
Ulcerative *pain*, crb. nat-m. rhs.
Violent *pains*, ars. ver. cup. phos. hell. lach. plb. ip.
Vomiting, ip. ars. ver. nux. cup. phos. op. bry. pul. dig.
— *relieves*, hyo.
Walking, *while or after*, sep. clc. phos.
Water, *as if full of*, mil. phe.
Weakness, *sense of*, ign. dig.

Ptyalism, or excessive flow of saliva, is frequently associated with pregnancy. In a few cases, the secretion has amounted to two or three quarts in the course of the day. The remedies best calculated to relieve are those which follow:

Belladonna.—Much mucus in the mouth; great flow of saliva; violent constriction of the fauces; violent constrictive pain at the scrobiculum; long-lasting gastralgia; continual pressure to urinate; passage of scanty urine; frequent passage of pale, watery urine; violent pressure and bearing down towards the sexual organs; pressure in the cardiac region.

Cocculus.—Running of saliva from the mouth; choking constriction in the throat; gastralgia; watery urine is passed in large quantities at short intervals.

Conium.—Salivation; faucial and gastric spasms; constrictive pain in the stomach with sensation of coldness in the stomach and in the back; very frequent urging to urinate and scanty passage; crampy pains in the lower portion of the abdomen.

Natrum mur.—Constant collection of water in the mouth, compelling her to spit frequently; constrictive gastralgia with sensation of coldness in the stomach and back; pressure in the abdomen every morning; pain as from a load in the abdomen, or as though everything would be torn apart while walking; pressure and bearing down from the side of the abdomen towards the sexual organs, in the morning, compelling her to rest quietly; frequent passage of profuse, hot urine, with violent urging, as often as every half-hour, even while drinking less than usual; pressive pain in the cardiac region in the morning.

Nux vom.—Frequent collection of saliva in the mouth; asthmatic, constrictive oppression across the chest while walking and ascending; cardialgia and convulsions; constrictive, oppressive pain in the stomach; continuous pain in the stomach; frequent ineffectual urging to stool, even after a sufficient evacuation; bearing down in the abdomen towards the sexual organs; painful, ineffectual urging to urinate; increased quantity of urine, exceeding in amount the quantity that was drunk; pain in the abdomen and bearing down towards the sexual organs while walking in the open air.

Secale.—Increased secretion of saliva; severe pressure in the stomach without loss of appetite; gastralgia; urination is accomplished with difficulty, with frequent urging thereto; increased passage of watery urine.

Veratrum.—Salivation; much tasteless water runs into the mouth; crampy constriction in the pharynx, and gagging; cardialgia; violent pressure in the scrobiculum; pressure in the cardiac region; pressive pain in the bladder; palpitation of the heart.

Kali jod.—1^{x} has proved efficacious in many obstinate cases.

Other remedies are *jaborandi*, *mercurius*, and *acetic acid.*

Pruritus.—Distressing itching, without visible affection of the skin, occasionally torments pregnant women beyond all endurance. The affection may be limited to the distended abdominal walls, and, in other cases, to the vulva and vagina. It is most frequently a reflex nervous affection; at other times the result of irritating vaginal discharges; and again the effect of ascarides. When the vulva and vagina are the parts involved, the vagina should receive a douche, made up of water in which has been put carbolic acid, borax or hydrastis, and the vulva washed with the same. What some regard as a still

better wash is aqua menthæ piperitæ. If dependent on ascarides, a wash composed of an infusion of tobacco or garlic may be used.

A mild galvanic current, with the anode at the vulva and the cathode on the sacrum, will sometimes relieve. When the abdominal surface is the seat of the trouble, temporary relief may be obtained from the local use of chloroform liniment or a solution of carbolic acid. The principal homeopathic remedies are *borax* (which should be used both locally and internally), *conium, platina, sepia, graphites, petroleum, tarantula,* and *collinsonia.*

It may be that the distressing itching is chiefly in the urethra, in which case injection of a two per cent. solution of *cocaine* affords immediate relief. It will require a few, but not frequent, repetitions. We have been driven to the use of this remedy upon the vulva and within the vagina, in a few instances.

Face-ache.—Neuralgia of the fifth nerve is often experienced, and *atropin, belladonna, arsenicum* or *gelsemium* will generally relieve it. Should the indicated remedies fail to afford relief, resort may be had to the external application of *aconite, chloroform* or *camphor liniment.* The continued use of hot water is sometimes a great aid; and the galvanic current is often efficacious.

Cephalalgia.—The remedy may be selected according to the following symptoms:

Bryonia.—Bursting or splitting headache; dryness of mouth and lips.

Natrum mur.—Awakens every morning with a violent headache.

Actæa rac.—Pain over either eye, or in the eyeballs.

Belladonna.—Sense of great fullness of the head.

Nux vomica, gelsemium, aconite, glonoinum.—Head feels much too large.

Belladonna, bryonia, calc. carb.—Fullness and heaviness of the forehead.

Belladonna.—Determination of blood to the head, with throbbing headache; right-sided headache.

Argent. nit.—Sensation of great expansion, especially of the head and face.

Mercurius.—Pressing headache from both sides as if the head were in a vise.

Phos. acid.—Dreadful pain in the vertex as if the brain were crushed.

Aconite.—Piercing throbbing pain in forehead, worse from motion; brain feels as though it would press out at forehead.

Kali bich.—Pain of a dull, heavy, throbbing character, mainly in the forehead, worse after eating.

Lachesis.—Beating headache, most violent over the eyes.

China.—Throbbing headache after excessive depletion.

Glonoinum.—Throbbing in the temporal arteries.

Nux moschata.—Headache from eating too much.

Calcarea carb.—Beating headache, seemingly in the middle of the brain.

Sepia.—Beating headache in the occiput.

In every case of severe headache in pregnancy the urine ought to be tested for albumen, and to determine the quantity of urea, for fear that an impairment of the renal function lies back of the symptom.

Insomnia.—Continued sleeplessness is not only distressing to the patient, but it is liable so to reduce her vital energies as to render her poorly prepared to undergo the violent strain of labor. Moderate exercise, pure air and frequent baths, will generally bring the needed repose. Certain remedies will aid:

Actæa rac., hyoscyamus, coffea, caulophyllum.—Sleeplessness.

Aconite, arsenicum alb.—Sleeplessness and restlessness.

Sulphur.—Drowsy during the day; sleepless at night.

Nux vom.—Cannot sleep after 3 A.M., ideas so crowd upon the mind.

Calcarea carb.—Cannot sleep after 3 A.M.

Calcarea carb., china.—Cannot sleep because of involuntary thoughts.

Belladonna.—Sleepy but cannot sleep.

The last remedy, in our experience, is indicated oftener than any other.

Anæmia.—In our account of the changes wrought in the organism by pregnancy, we entered somewhat in detail into an account of the blood-changes which take place, and to that we now refer for the pathology. As the result of these changes, symptoms of a more or less aggravated nature develop, varying in degree to correspond with the extent of deviation from the normal type. Within limits, the changes may be regarded

as normal, but when they become excessive, the organism shows signs of suffering and deterioration. The red blood corpuscles being reduced in number, if the diminution continue, the cell elements suffer, and finally waste, or fill with fatty molecules. Then follow loss of weight, muscular prostration, impaired functional activity of the secretory organs, and increased nerve irritability. All the functions of the body are impaired, and the patient, unless the morbid changes become arrested, soon sinks to death. While such a termination is not impossible, the deterioration and disintegration are usually brought under control, and the patient is ultimately restored to a fair degree of health.

This distressing condition is much more easily prevented than cured. Preventive treatment lies in the direction of obedience to the laws of hygiene governing both mind and body. "Light, air, moderate exercise, good food, regulation of the bowels, cheerful society, and an occasional respite from household and family cares, will always be the main checks to its extreme development."

As a result of hydræmia, there may be extensive œdema, which gives rise to much discomfort, and requires special attention. When it is extreme in certain parts, gangrene may threaten, and puncture be required. If the skin of the lower limbs becomes painful from great tension, application of hot cloths will afford some relief.

Medicinal treatment consists in the administration of one or more of the following remedies, the action of which should be prolonged, since beneficial effects are slowly manifested.

Ferrum, in one of its several forms, is most frequently employed with good results. The metallicum is often used, as well as *ferrum et strychnia, citrate,* and *ferrum phosphoricum.*

Pulsatilla is capable of affording relief in some of these cases, especially when the attack is of the milder type. There is constant chilliness, coldness, and paleness of the skin; coldness of the feet; irregular pulse, and palpitation of the heart; want of appetite; vertigo, especially on rising; mild, weeping mood, or excessive irritability.

None of the foregoing remedies have been in our hands as serviceable as *arsenicum jod.* The *arsenicum album* may do as well in most instances. When these remedies are indicated, there are pallor, more or less œdema, restlessness and a sense of weakness.

Nux vomica, when indigestion is a troublesome feature, and there is constipation, or small loose stools, with urging.

Numerous other remedies will be found useful, such as *helonias, phosphorus, cyclamen, calcarea carb., sulphur,* etc.

For the dropsical symptoms, we find help in *arsenicum album, apis mel., helleborus* and *apocynum can.* When limited to the feet and legs, *bryonia* may be the remedy.

Albuminuria.—Albuminuria, associated with pregnancy, was little known by the profession until within about forty years. Roger, in France, and Lever, in Great Britain, were the first to direct attention to its intimate relationship to that appalling complication of pregnancy and puerperality, eclampsia. For many years it was supposed that convulsions occurring in the pregnant or puerperal woman were always preceded by, and in a measure dependent on, albuminuria. But more recently it has been shown that this is not true, for in some cases albumin is not present in the urine until after convulsions have begun; and again it does not appear at all.

Albuminuria is also associated with other affections to which pregnant women are subject, as for example, puerperal mania, vertigo, headache, and certain forms of paralysis, either of the nerves of special sense, as in the instance of amaurosis, or of the spinal system. The relation which it bears to these diseases is not yet well understood. It should always be regarded with apprehension, and vigorous efforts made for its removal.

Blot and Litzman met it in twenty per cent. of all cases examined, but this is far above the estimate of other authors. Dr. Fordyce Barker believes it occurs in about one out of twenty-five cases, or four per cent., and Hofmeir found it in 137 out of 5,000 women delivered in the Berlin clinic, which represent about 2.74 per cent. In most cases it disappears soon after delivery, and hence the causes upon which it depends must be temporary. It follows, therefore, that albumin in the urine of pregnant women, while it justly arouses considerable anxiety, does not always assume the grave importance which it does in the non-pregnant state.

CAUSES.—The origin of this disorder is usually sought in the conditions of pregnancy, but beyond this point opinions greatly diverge. The blood-changes already described as taking place in pregnancy, may have a causative relationship to albuminuria. Still, it is observed that in the worst cases of anæmia during gestation, albumen is rarely found.

It is supposed by some that albumin in the urine is due to congestion of the renal vessels by the gravid uterus. This may be true of some cases, but, in general, it cannot be regarded as the only, or even the chief, cause, as a similar pressure is exerted by uterine and ovarian tumors without producing such an effect.

The increased arterial tension doubtless constitutes an important causative factor. All careful observers have found it much above the normal. Fancourt Barnes believes it possible to predict "with almost absolute certainty, albuminuria, with its usual puerperal complication, eclampsia," from the increased and increasing vascular tension.

In a certain number of instances, albuminuria antedates pregnancy. When this is true, there is during gestation nearly always an aggravation of the pathological condition.

Symptoms.—One of the most common symptoms of albuminuria is œdema, which is a dropsical condition of the subcutaneous cellular tissues. It is exhibited especially in the extremities and face, and sometimes becomes excessive. Œdematous swelling of the feet and legs is observed in a large proportion of pregnant women, though it is associated with albuminuria in only a small proportion of them. Sometimes the œdema spreads until it becomes general anasarca, and the woman presents a pitiable aspect.

There are also many nervous symptoms connected with albuminuria, such as vertigo, cephalalgia, dimness of vision, spots before the eyes, and nausea. The appearance of such symptoms in a pregnant woman, whether associated with œdema, or not, should impel the physician to a thorough chemical and microscopical examination of the urine.

The Effects.—The various diseases associated with albumen in the urine, either as cause or effect, require separate consideration, inasmuch as some of them are among the most dangerous complications to which a pregnant woman is liable. Several of these have been alluded to as symptoms of albuminuria, such as cephalalgia, vertigo and paralysis; but that which stands out most prominently is eclampsia. The precise mode in which the last named disease is produced will be considered when we come to discuss in detail the cause, course and treatment of it in another chapter. The acutest cases are most hopeful. Those in which albuminuria sets in early are extremely liable to become chronic.

We have before said that albumin appears in the urine of women suffering from puerperal mania, and various forms of paralysis; but whether as cause or effect, cannot be positively stated.

PROGNOSIS.—The danger to mother and child in connection with albuminuria in pregnancy is not slight. Goubeyre estimated that forty-nine per cent. of primiparæ who manifest the diseased condition, and who escape eclampsia, die from morbid results traceable to the albuminuria. Hofmeir found that out of forty-six cases reported by him, only one-third had eclampsia, though one-half died. Including both acute and chronic cases, Braun estimates that only sixty in the hundred develop uræmic convulsions. Hofmeir found in five thousand births recorded upon the books of the Berlin Clinic, 137 cases of nephritis entered. Out of this number only 104 patients were attacked with eclampsia. Prof. Bamberger reports from autopsies of the "allgemeinen Krankenhaus," in twelve years, 2,430 cases of Bright's disease, of which 152 were found in puerperal and pregnant women, namely: 80 acute cases, 56 chronic cases, and 16 cases of atrophy. Puerperal eclampsia was recorded in 23 of them.

A modifying condition has been shown by Bailly to exist, namely, that not rarely albuminuria in pregnant women disappears for several hours, and then reappears, so that it may happen that an examination is made during the short period when the urine ceases to be albuminous. It should be borne in mind, however, that it is the renal insufficiency, and not the albuminuria, which causes uræmia and convulsions. The mere absence of albumin from the urine does not even exclude the existence of Bright's disease.

Convulsions occur more commonly in primiparæ than in multiparæ, especially in elderly primiparæ, in twin pregnancies, in women with contracted pelves, and in connection with the delivery of male children. They may occur epidemically in consequence of atmospheric conditions, which probably interfere with the functions of the skin, modify the peripheral circulation, and thus indirectly increase the labor thrown on the kidneys.

The danger of eclampsia is decided and unmistakable; but besides this, owing to imperfect nutrition of the fœtus, by maternal blood impoverished through loss of albumin, there is manifested a strong tendency to abortion. This fact has

been observed by many authors. A good illustration of it is given by Tanner, who states that out of seven women he attended, suffering from Bright's disease during pregnancy, four aborted, one of them three times in succession.

The urine usually presents the common indications of serious renal involvement, namely, scantiness, high color, epithelial cells, tube-casts and occasionally blood.

Conclusions.—Leopold Meyer, from observations upon 1,124 pregnant and 1,138 parturient women, draws the following conclusions:

1. In 1,124 non-selected cases of pregnancy, he found albuminuria in sixty-one cases (5.4 per cent.), in twenty-two of which he also found casts 2 per cent.)

2. Albuminuria with casts occurred a little oftener in those cases where albuminuria appeared for the first time in the earlier months of pregnancy than in those where it appeared later on.

3. The age of the women had no influence in regard to the frequency of albuminuria.

4. Albuminuria with and without casts occurred most frequently between the 101st and 170th days and between the first and fourteenth day before parturition.

5. Of those women who had not albuminuria 19.7 per cent. had premature labors; of those with albuminuria but without casts 27.7 per cent.; of those with albuminuria but with casts 41.2 per cent.

6. Of pregnant women who had albuminuria without casts 55 per cent. were free from it, and healthy during labor; of those who had albuminuria with casts only 12 per cent. had no albuminuria when at full term.

7. Of 1,138 parturient women,25 per cent. had albuminuria without and 12 per cent. with casts.

8. Albuminuria during parturition was a little more frequent in the primiparæ than in the multiparæ.

10. Albuminuria without casts, which was only observed during labor, and did not exist before, disappeared as a rule rapidly.

11. Albuminuria with casts, disappeared as a rule rapidly after parturition, generally after the 4th day. Yet occasionally it persisted longer, especially if it had existed during pregnancy. The age nor the number of pregnancies had any influence on the course of the disease.

12. Of the women who had not albuminuria 1.9 per cent. had still-born children. Of those with albuminuria but without casts, 2.1 per cent. of those with albuminuria and casts, 2.9 per cent.

TREATMENT.—It is extremely desirable to recognize this disease in its incipiency, and in order so to do, every case which presents suspicious symptoms ought to be carefully examined. It is a lamentable fact that, in the larger number of instances in general practice, the medical adviser has no knowledge of the woman's condition until convulsions set in.

Treatment should be modified to meet the various indications presented by individual cases. The stage of the reproductive process at which the woman has arrived, namely, pregnancy, labor or puerperality, the severity of the symptoms, and the cause of them, are all important considerations. If the cause of the albuminuria is traceable to pressure of the gravid uterus on the surrounding organs, thereby producing hyperæmia of the renal secretory apparatus, treatment ought to be varied in some essentials from that which would be employed when albumen in the urine is referable to a different cause. Again, a slight trace of albumen, with no pending constitutional disturbances, would not justify the same heroic treatment which might seem indicated when convulsions threaten the patient's life.

Frequent examinations of the urine ought to be made with special reference to ascertaining the quantity of albumen and urea. A woman weighing 140 pounds ought to excrete 500 grains of urea every twenty-four hours; and when the quantity falls much short of that in a given case, uremic symptoms are liable to develop.

The prominent indications for us to follow are, to diminish the tendency to renal congestion, and to bring the blood into its normal condition.

The Milk Diet.—The regulation of diet is one of the most essential features of treatment. All obstetricians agree in recommending milk as the exclusive article of food. Tarnier gives the following rules for guidance, to be adopted as soon as the albumen appears in any considerable quantity in the urine:

First day, a quart of milk, with two portions of food.

Second day, two quarts of milk, with one portion of food.

Third day, three quarts of milk, with one-half portion of food.

Fourth and following days, four quarts of milk, or milk *ad libitum,* without other food or drink.

In severe cases, if prodromata of eclampsia appear, put the patient at once on three or four quarts of milk per day. The influence of the milk diet is never slow in manifesting itself, and in eight to fifteen days after beginning this treatment, the albuminuria is diminished very considerably, or even cured.

This diet will not be equally well borne in all cases; but by judicious management, and the use of indicated remedies, it will nearly always become tolerable.

Therapeutics.—Homeopathy has provided us with remedies which have a most salutary effect on this disease. Among them *mercurius corrosivus* occupies the highest place. "Experience," says Dr. Ludlam, "has led me to place great confidence in the mercurius corrosivus. I have prescribed it very frequently to fulfill this precise indication, and it has seldom disappointed me. * * * The idea which I design to convey is not that this, or any other remedy, is an absolute specific for antepartum convulsibility. There is no real prophylactic of puerperal eclampsia. But if in one case in ten you can recognize incipient symptoms of this dreadful disease, and avert it, you should know how to do it."

Arsenicum is a valuable remedy. The œdema is observable in the face, especially about the eyes; the countenance is pale; the thirst intense; the patient restless; the urine scanty and passed with difficulty.

Apis.—Urine scanty and high colored, albuminous, and containing uriniferous tubules and epithelium; œdema of face, hands and lower extremities; œdematous eyelids; great prostration in association with pale waxy skin; drowsiness with restlessness; irritation of bladder; frequent desire to urinate, with the passage of only a few drops; no thirst; patient tearful and absentminded.

Glonoinum.—Abundant, highly albuminous urine, which she must rise at midnight to pass; urine high-colored, and burning. In connection with these indications of renal fullness, we have, as corroborative symptoms, the violent headaches peculiar to this drug, congestion of the head with paleness of the face, throbbing felt with every pulsation of the heart, at every step or jar; blood mounts from neck, throat and chest,—from occiput to eyes; pressure from within outwards in both temples; brain feels too large and as if it would burst, impelling

her to hold both hands to the sinciput; laborious action of the heart; the patient in bad humor.

Helonias.—Albuminuria during pregnancy. Urine profuse, clear, and light-colored; frequent desire; urine burns; heat and pain in the region of the kidneys, so that their outlines can thereby be traced; aching and tenderness of the kidney, weariness, languor and weight in the region of the kidneys; general malaise, unusually tired; drowsy, sleepy, melancholy mood.

Cantharis.—Not often indicated in the ordinary albuminuria of pregnancy; but may be the only remedy when acute nephritis occurs, or when an acute attack is engrafted upon a nephritis already existing. Urine turbid, scanty and containing mucus, casts and shreds. Pains in the loins and abdomen, with pain on urinating, and with constant desire. Convulsions, with œdema.

Antimonium tartaricum.—Patient in bad humor; urine brownish-red, scanty, turbid and of strong odor. Blood contains urine. Associated with these conditions of the urine, the gastric derangements peculiar to the remedy are sometimes observed, such as vomiting of mucus, belching, disgust for food, and salivation. There may also be bronchial catarrh, dyspnœa, and pulmonary œdema consequent on uremic oppression of the nerve centers. The face is pale, and the tongue is white.

Argentum nitricum.—Urine sufficient in quantity, but it contains a relatively large quantity of albumen.

Colchicum.—Pain in renal region, frequent urination, but diminished excretion; weakened memory, clouded intellect, mental depression, occipital pressure. This remedy frequently does excellent service.

Helleborus.—Frequent desire, with scanty urine.

Phosphorus.—Albumen, and exudation cells in the urine.

Terebinthina.—Urine scanty, dark and albuminous.

Kalmia is often useful, though in the recorded provings there are no indications of its value in kidney affections. By virtue of its power over the heart, and secondarily over the kidneys, its use has been followed by good results, especially when great and persistent aching pains in the limbs were present, without evidence of local inflammation.

Induced Labor for Albuminuria.—Allusion is sometimes made to this as "Schroeder's method." In obstinate cases the question of resort to this operation is forced upon us. Hofmeir believes that it does not increase the risk of eclampsia, while it

may altogether avert an attack. The operation has been advocated by others. On the other hand, Spiegelberg opposes it, and Fordyce Barker thinks it should be resorted to only "when treatment has been thoroughly and perseveringly tried without success for the removal of symptoms of so grave a character that their continuance would result in the death of the patient." "We discard," says Charpentier, "the question of premature labor for the following reasons:

"1. The success which we have had with the milk diet is such that we believe all other treatment useless, particularly when the milk diet is carefully and sufficiently observed during pregnancy, and soon enough to produce its effects.

"2. When the albuminuria is slight, the interruption of pregnancy appears useless, the gravity of the accidents which occur in pregnant women, who are at the same time albuminuric, being, in general, in direct relation with the amount of albumen.

"3. When albuminuria produces serious symptoms, it depends upon, not only pregnancy, but also a serious renal affection, which may progress after confinement, and cause, as the observations of Hofmeier prove, the death of the patient.

"4. Labor, as we have seen, has a marked influence in the production of albuminuria and of eclampsia; and, as the induction of premature labor, and with still more reason, abortion, always requires a certain length of time, the result may be that, during this time, the patient may be placed in a condition still more unfavorable than that in which she already is, by the mere fact of the albuminuria from which she is suffering.

"Finally, although it is true that, in a number of cases, albuminuria has disappeared after the death of the fœtus, and the real cessation of pregnancy, there are many other instances in which it has reappeared at the onset of labor, accompanied or not by eclampsia."

"It is not easy," says Playfair, "to lay down any definite rules to guide our decision; but I should not hesitate to adopt this resource in all cases in which the quantity of albumen is considerable, and progressively increasing, and in which treatment has failed to lessen the amount; and, above all, in every case attended with threatening symptoms, such as severe headache, dizziness, or loss of sight. The risks of the operation are infinitesimal compared to those which the patient would run in the event of puerperal convulsions supervening,

or chronic Bright's disease becoming established. As the operation is seldom likely to be indicated until the child has reached a viable age, and as the albuminuria places the child's life in danger, we are quite justified in considering the mother's safety alone in determining on its performance."

We believe few cases, if properly managed, will prove intractable to the milk diet and suitable remedies, but in those which do, we should not hesitate to bring on premature labor, and hasten it to a close.

Chorea During Pregnancy.—*Chorea gravidarum.*—This, fortunately, is a rare complication, and occurs chiefly in young, nervous women, a large percentage of whom have had chorea in childhood. It most frequently sets in during the third, fourth or fifth month. Among the recognized causes, apart from heredity, are anæmia, profound emotions and repercussed eruptions. The mere irritation arising from normal development of the ovum in certain susceptible women, may constitute an efficient cause.

Its prognosis, in cases brought under suitable treatment, does not appear to be as grave as some authors would lead us to believe. Still it must be regarded as a serious affection. Dr. Barnes compiled fifty-six cases, of which number seventeen died. Its danger is not to life alone, for it appears that the disease is quite liable to leave permanent impairment of the mental faculties. It has also an unquestionable tendency to excite abortion and premature labor, and hence to sacrifice fœtal life.

Treatment.—Special effort should be made to protect the patient from all possible sources of irritation, and to render her surroundings as pleasant as possible. Good food, fresh air, regular baths, followed by brisk rubbing, and such exercise as she can bear without great fatigue, are the general indications for treatment. "There are nervous conditions which simulate chorea," writes Dr. Ludlam, "that yield readily to such remedies as *belladonna, ignatia, coffea, nux vomica, agaricus,* and *cuprum,* under appropriate indications. These states are temporary, and often depend upon avoidable causes. They are easily cured."

Spasms of chorea caused by fright, require *aconite, ignatia, opium* or *cuprum.*

When proceeding from suppressed eruptions, *cuprum aceticum, sulphur, calcarea carb., arsenicum* and *causticum* are the remedies from which selection should be made.

When the cause remains latent the remedies from which to choose are *veratrum viride, belladonna, pulsatilla, sepia, sabina, gelsemium, tarantula* and *caulophyllum,* the particular indications for which will be found mainly in the mental and physical traits, taken in connection with collateral manifestations.

If, in spite of our remedies, the paroxysms increase in severity, and the patient's strength appears to be exhausted, counsel agreeing, labor may be induced. The choreic manifestations usually terminate with complete evacuation of the uterus.

The propensity of chorea to recur in successive pregnancies should be remembered, and precautions of the best character adopted.

Hysteria.—Well-marked hysteria is not commonly observed in pregnancy, though many women evince symptoms of a nervous character, which, in some respects, resemble it: hence we find that authors have little to say about it. Such symptoms are more prone to appear in the early part of gestation, and may condense into distressing convulsions. Indigestion, excessive fatigue, loss of sleep, and a variety of occurrences and conditions, operating on a nervous system very sensitive, and already a little out of tune, may so confuse its action as to set the various functions to work at cross purposes.

Mere remedies, however well suited to the case, are hardly sufficient. The disorder being largely emotional, the patient's mind has to be brought under subjection, not by harsh, but by the gentlest possible, measures. Anything which is calculated to strike the fancy, to divert, overwhelm or control the emotional elements of her nature, if not brought to bear with too much force and energy, will have a beneficial effect. These cases are exceedingly difficult to handle, and demand the exercise of our best judgment and keenest tact. The judicious employment of friction, electricity, bathing and exercise, is to be recommended. Even hypnotism may be cautiously employed. Electricity ought to be used with great caution, for fear of exciting uterine action.

Among the remedies most frequently employed are the following:

Ignatia.—This remedy most happily affects women of a nervous temperament, of dark hair and eyes, of quick mental faculties, and with an inclination to low spirits. They are exceedingly sensitive to the discomforts and inconveniences of

their state, and may quietly grieve, or become greatly vexed over them.

Pulsatilla.—The temperament here is not necessarily nervous, but there are the delicate sensibilities, light complexion, fair skin, and mild eyes,—most frequently blue. The weeping mood is characteristic. The temper is sometimes petulant, but the tears are quite likely to soften its effect.

Caulophyllum.—We have found this a very useful remedy, but its characteristics are not clearly defined.

Nux moschata.—The woman, instead of being excessively sensitive to impressions, is quite the opposite. She is inclined to stay within doors, and takes but little interest in what is going on about her. The mental faculties are dull, the memory weak, and drowsiness is well marked.

Nux vomica.—This remedy acts chiefly on the spinal cord, and the effect is excitement. The mental traits are characteristic, there being irritability, dislike for work and disgust for life. The temperament is masculine, but nervous. We have not often found this an indicated remedy.

Moschus.—Women of excitable disposition, melancholy mood, with a tendency to coldness. It is especially valuable for its immediate effects upon hysterical paroxysms.

Gelsemium.—Sometimes of service when there are depression of spirits, restless sleep, aching in the limbs, weakness and trembling.

Many other useful remedies might be mentioned, but those named have in our hands proved most beneficial.

Paralysis.—Pregnant women seem peculiarly liable to various forms of paralysis, but more especially hemiplegia and paraplegia, the former being more frequent. The subject is too extensive for anything more than brief mention here. In a general way it may be said that the disease seems in many cases to be associated with albuminuria and uræmia.

Many modern authorities advise the induction of premature labor in cases wherein paralysis appears in connection with albuminuria; but the results of the milk diet and homeopathic medication are so satisfactory that the advice should be received with caution. Upon disappearance of the albuminuria the paralysis usually improves. If it persist, the induced current, friction, bathing, and a continued use of the homeopathic remedy, usually prove effectual. For the relief of paralysis not associated with, or dependent upon, albumi-

nuria, the induction of premature labor would be manifestly improper.

The results of homeopathic medication, when aided by the milk diet, are in the main so satisfactory that the cases of paralysis dependent on albuminuria, calling for the induction of premature labor, are few. The remedies of greatest service have already been given under the head of "albuminuria," and need not be repeated here. If we are driven to the induction of labor, or if it comes on naturally, without relief of the paralytic condition, the remedies which will be most beneficial are *nux vomica, gelsemium, mercurius cor., arsenicum, sulphur* and *calcarea carb.*

Syncope.—Attacks of syncope, while not very common, are experienced by pregnant women. They oftener occur during the first three trying months, when all the functions are more or less disturbed, and the nervous system so very sensitive to every impression. The attack is not often a fully-developed fainting fit, and hence consciousness is not entirely lost; yet the patient may lie with dilated pupils, feeble pulse, and in semi-consciousness, for several minutes, or much longer.

In the way of treatment, lay the patient on her back, with the head low; supply plenty of fresh air, and give ammonia, amyl nitrite, or spirits of camphor, by inhalation. If the attack be prolonged, a sinapism to the precordia will be found of good effect. Select a remedy according to the symptoms:

Aconite, cact. grand.—Palpitation of the heart.

Arsenicum.—Debility or prostration.

Bryonia.—Great thirst and drinks much cold water.

Camphor.—Very weak pulse; coldness of the whole body.

Carbo veg.—Eructations.

Chamomilla.—Irritability; dimness of vision; nausea.

China.—Cold perspiration; ringing in the ears.

Cocculus indicus.—Paralyzed feeling in all the limbs, with trembling.

Digitalis.—Pulse slow and irregular; cold sweat.

Ignatia.—Much trembling.

Nux Vomica.—Vomiting; trembling.

Sepia.—Feet and hands cold as ice; flushes of heat.

Stramonium.—Fainting; pale face.

Veratrum alb.—Cold sweat upon the forehead.

Painful Mammæ.—The changes which are begun early in pregnancy to prepare the mammæ for activity, always excite

more or less distress, sometimes amounting to real pain. The suffering is more intense in those cases where the breasts have been systematically compressed with corsets and pads.

Inunctions with warm oil, and the application of poultices when the pain is severe, will afford considerable relief.

Bryonia, when the pain is sharp and stitching, the breasts sensitive to touch, and the pain increased by the jar of walking.

Belladonna, when there are redness, heat and induration, with distensive pain.

Phytolacca, when the glandular structures seem to be involved in inflammatory action, and the pain is intense. It may be applied locally with additional benefit.

Pain in the Side.—During the fourth or fifth month, and sometimes later, women often experience pain under the false ribs, on one side, or both. *Nux vomica* will generally relieve in a few days. *Bryonia, belladonna, arsenicum, caulophyllum* or *pulsatilla* may be required.

Pain in the Abdomen.—As the result of the excessive distension to which the abdomen is subjected, there is more or less pain, depending in severity on the original tenseness of the abdominal walls, the degree of distension and the sensibility of the patient.

Inunctions of cosmoline, vaseline or some other oleaginous substance, is helpful.

Sepia, if the abdominal walls are exquisitely sensitive to the touch.

Conium, if there is pain in the abdomen after going to bed, ameliorated by rising and moving about.

Leucorrhœa.—The wonderful physiological changes going on in the pelvis during pregnancy, necessitate a strong determination of blood to this part of the body, and excite into activity every function. Hence, the natural secretions of the glands are increased in quantity, and require attention only when they become excessive. The secretion which appears in the form of leucorrhœa is mainly from the cervical glands, but the vaginal and vulvar glands also contribute. It is sometimes very copious and occasionally acrid, in which latter case the whole genital tract may be hot, swollen and painful. The irritation, if communicated to the urethra, will create frequent and painful urination.

To control this annoying symptom, rest from sexual indul-

gence, and a daily enema of tepid water, are often all that is required. In other cases the discharge is pertinacious.

Pulsatilla.—The discharge is thick white mucus, and is extremely irritative.

Hydrastis.—Irritative leucorrhœa, with coexisting indigestion and debility. (A mild solution of the ordinary fluid extract, or, what is better, the "fluid hydrastis," should also be used as a vaginal injection.)

Mercurius.—Yellowish, purulent leucorrhœa, producing soreness of the parts.

Arsenicum.—Thin burning leucorrhœa.

Graphites.—Profuse leucorrhœa, especially in a scrofulous subject.

Odontalgia.—Toothache often proves to be a real torment to women during pregnancy. It may set in immediately after impregnation, and continue, at short intervals, throughout pregnancy; but in general it proves to be quite amenable to treatment.

Sepia has long sustained the reputation of being the most serviceable remedy in this annoying affection.

Belladonna, if there is determination of blood to the head, with either paleness or redness of the face.

Mercurius is the remedy when the affected tooth is carous, the pain more severe at night and the tongue somewhat coated and presenting the impression of the teeth about its margin.

Staphisagria for women with a rheumatic diathesis, teeth dark, carious and apparently uncared for; the pain is worse when the tooth is touched, especially by hot things; also worse when out of doors or drawing cold air into the mouth, and worse at night.

Coffea for oversensitive, nervous women, the pain sudden and violent, and the mental faculties active.

Pulsatilla, when it begins in the evening and continues through the night, especially in women of mild temper, with inclination to tears.

Nux vomica.—The pain is increased by fresh air, wine, coffee, cold, and mental labor, and diminished by warmth. Shooting in the teeth and jaws, extending into the bones of the face and head, with a grinding, pressing or drawing in the decayed tooth.

Plantago maj. is an excellent remedy.

Kreosotum, that prince of remedies for toothache, should not be forgotten.

The selected remedy may be tried for an hour or two, but, in a very painful attack, if some relief is not then afforded, it should be exchanged for another.

When other means for relief have failed, palliative measures are in order, among which are brushing the gums with spirits of camphor, applying equal parts of alcohol, chloroform and ether, use of the galvanic current, plugging a carious cavity with cotton saturated with a strong solution of cocaine, etc.

There is no doubt that pregnancy predisposes to caries, and the latter condition of the teeth may necessitate mechanical interference, such as extraction, filling, etc. "There is much unreasonable dread," says Playfair, "amongst practitioners as to interfering with the teeth during pregnancy, and some recommend that all operations, even stopping, should be postponed until after delivery. It seems to me certain that the suffering of severe toothache is likely to give rise to far more severe irritation than the operation required for its relief, and I have frequently seen badly decayed teeth extracted during pregnancy, and with only a beneficial result."

Cramps.—Pregnant women are often annoyed by cramps in the abdomen and limbs.

Veratrum album, taken before going to bed, will generally prevent them. Dr. L. A. Phillips says that *ammonium muriaticum* has, with him, proved to be almost a specific for them, especially those occurring in the legs. *Nux vomica* or *coffea* may be given to nervous, sensitive women. *Secale, cuprum* and *strontiana carb.* are also of benefit. *Gelsemium* seems well suited for relief of cramps in the abdomen.

Traumatic Complications of Pregnancy.—Among the questions which confront us is that concerning the risk of premature expulsion of the product of conception, arising from traumatism, whether accidental or surgical. The chief danger arises from reflex effects on the uterine muscular fibers, expressing themselves in immoderate contractions; but there are other dangers, namely, destruction of fœtal life from maternal hemorrhage, and likewise from maternal toxæmia.

In considering the first of these risks, we ought to recollect that the uterus is not at rest during gestation, but is in rhythmical contraction. Throughout the greater part of pregnancy, this organ, as we can easily demonstrate, never wearies of contracting and relaxing, at tolerably regular intervals. Labor itself is but an intensification of this action. This truth being

recognized, we readily see with what facility irritation applied to certain parts of the body may, by reflex action, augment uterine energy, and precipitate expulsion of the immature ovum.

The womb, like other organs, responds much more promptly to irritation existing in one part of the body than in another; and therefore extensive traumatism can be inflicted with comparative impunity over certain areas, while rapid effects follow interference with others. Then, too, in some women the reflex function is on the *qui vive,* while in others it is extremely lethargic. Little experimentation is required to determine that stimulus applied to the mammæ, the external genitals, the anus, and the uterus itself, quickly excites the uterine muscles. Accordingly it has been found that operations involving these parts are more frequently followed by abortion.

When women are in a state of health, and free from morbid disposition, normal pregnancy is not easily interrupted. Matthews Duncan mentions a case, wherein an intra-uterine stem pessary was introduced, and worn for some time during pregnancy, without exciting miscarriage. A woman seven months along in gestation jumped from the third story window to the pavement, without suffering loss of the ovum, though she broke both legs and both arms. Operations of all degrees of severity have been performed with immunity from the result in question; limbs have been amputated; ovaries have been removed; the vaginal portion of the cervix uteri has been cut off, and subserous fibroids have been taken away by laparotomy. Aye, when women, such as the subjects of these accidents and operations, set about procuring abortion, they, and their accessories, are sometimes driven almost to desperation by the futility of their efforts. On the other hand, a slight strain, or an insignificant wound, in certain women, is sufficient to precipitate uterine evacuation. In a woman who has no disturbance of functional activity, no depreciation of vital energy, and no morbid predisposition to miscarriage, pregnancy is interrupted only by certain efficient causes operating at a favorable moment. To such patients irritation may be applied for a brief period, without harmful effect; and it seldom becomes overpowering unless unusually prolonged. They may fall down stairs, or they may be incised in vital parts, and still hold tenaciously to their immature progeny. But even such women will finally yield, though with reluctance, to the force of reflex energy set in action by long-continued cumulative irritation.

Again, the monthly molimen is not wholly suppressed during pregnancy, but only under restraint: and influences which, at other times, would be innocuous, are, at that particular period, capable of doing serious harm. For this very reason women with a propensity toward miscarriage, require to be held in check, or put into strict quarantine, at such times. But what can be said of those who, from a slight shock, a high step, a long walk or a stirring emotion, to say nothing of severe traumatism, cast their untimely fruit? They make large drafts on our time, our patience, our ingenuity, our tact, our skill, our discretion and our sympathies, even in their best estate.

Apart from reflex causes of abortion proceeding from accidental or surgical injury, we ought not to forget that uterine evacuation may be brought about from harm accruing to the fœtus through maternal blood-loss, uterine congestion and general maternal toxæmia. Prior to the operation or injury, the woman may be anæmic, so that a sparing loss would so impair fœtal nutrition, already low, as to extinguish life. Again, strong uterine congestion may rupture some of the finer decidual vessels, and destroy the functions of so large a part of the placenta, that fœtal life can no longer be sustained. Finally, inasmuch as fœtal blood is aërated by the maternal blood through the process of osmosis, it follows as a necessary consequence, that profound toxæmia of the mother has a marked effect on the unborn child. The latter can bear a certain degree of contamination without fatal results, but, as with us in vitiation of the atmosphere by poisonous gases, when that certain point is exceeded, it falls a prey to the baneful influence.

To recite cases wherein serious operations were performed during utero-gestation, without interruption of its course, would profit little. They are by no means numerous in the practice of any one physician, and sound deductions can scarcely be drawn from my records, or those of any other obstetrician. Cohnstein, who devoted considerable time to the study of this subject, was enabled to collect sufficient data to establish a fair view of the danger of miscarriage, which awaits upon serious traumatism. He says that, in 54.5 per centum of all cases, pregnancy goes on to a natural termination. As evidence of the wonderful tolerance exhibited by some pregnant women, we may cite the case mentioned by Frommel, in which a sub-serous fibroid, with a sessile base, occupying considerable of the uterine wall, was removed. Convalescence was pro-

tracted by iodoform poisoning, but pregnancy continued an uninterrupted course. The physical state of his patient, and her environment as well, must have been of the most favorable kind.

Treatment.—Reflex effects can be greatly diminished by the employment of anesthetics, and, that, too, without special danger to the fœtus. Ether is oftenest the chosen agent, but we are convinced that its effect on the child is more pernicious than that of chloroform. The latter anesthetic seems peculiarly adapted to the pregnant woman, and, by general agreement, its dangers in midwifery practice are but a remove from perfect safety. Then, too (and this is a consideration of some weight in this connection), vomiting is less likely to result from its administration.

The best prophylactics are the antipsoric remedies, and, in our opinion, prominently, *sulphur* and *calcarea carb.* Temperament and general physique are the best indications upon which to base our selections.

Sulphur, for women of nervous temperament, inclined to be thin and narrow-chested. Skin rough, sense of weakness through the pelvis, flushes of heat and frequent faintness. She has a previous history of sparing flow at the month.

Calcarea carb.—Leuco-phlegmatic temperament, fair complexion, inclined to stoutness. Clumsy; feet cold and damp. Previous history of profuse flow at the month.

There are many other remedies for use before and after traumatism, among which should be mentioned *arnica, hypericum, caulophyllum, secale* (neither of the last two lower than the 3^{x}), *pulsatilla, arsenicum, gelsemium, china,* etc. Moreover, we would not hesitate to appeal to *opium* for its soothing effects after severe traumatism, provided there were urgent call for it, just as we would to *chloroform* or *ether* during the operation.

Under homeopathic care, both before and after operative procedure, the probability of uninterruption of pregnancy is rendered decidedly more promising.

Constipation.—This annoying complication of the pregnant state owes its existence not so much to the pressure exerted by the gravid uterus, as to diminished intestinal action. One very important factor in its production is doubtless the sedentary habits of women at such a time. When constipation exists, neglect of the bowels may give rise to fœcal accumulations,

sometimes of enormous size, which occasion great pain, and endanger premature interruption of pregnancy. If such a condition be allowed to complicate labor, it may serve as a serious impediment to descent of the fœtus.

Proper attention to the action of the bowels will prevent large accumulations, and do much to overcome the habit of constipation. Regularity of going to stool ought to be enjoined upon the woman, together with a choice of diet which will not include the more constipating articles of food. Fruits, in their season, should be recommended, graham bread, figs, and such other articles as are known to have a laxative effect upon the bowels. Sipping a half-pint or more of water, as hot as can be taken, thirty or forty minutes before each meal, will improve digestion and act as a gentle aperient. If, in spite of treatment, and the observance of such habits, the bowels still remain costive, an occasional enema of water, soap and water, or olive oil and soapsuds, will afford temporary relief. A teaspoonful of glycerine, as an enema, is very effective.

Aconite.—Much thirst; fear of death.

Alumina.—Scanty, hard stool.

Agaricus m.—Loud rumbling in the bowels.

Arnica.—Flatulency; colic, foul smelling flatus.

Belladonna.—Flatulency; obstruction of the bowels; much tendency of blood to the head; red eyes; intolerance of light; flushed face; heat in the head.

Bryonia.—Much thirst; rumbling in abdomen; irritable; mouth and lips dry; hard stool.

Carbo veg.—Flatulency, with colic and rumbling in bowels.

Causticum.—Constipation; rumbling in the bowels.

China.—Flatulence with colic; rumblings.

Conium.—Much vertigo.

Graphites.—Hard stool; itching blotches about the body; colic.

Ignatia.—Empty feeling at the pit of the stomach; rumbling.

Kali carb.—Unsuccessful desire for stool.

Lycopodium.—Rumbling and gurgling; incarcerated flatulence.

Mercurius.—Salivation; gums sore.

Natrum mur.—Hard stool; rumbling of flatus and incarceration; headache on awaking in the morning; aversion to bread; sore places in mouth.

Nitric acid.—Hard stool; bloody stool; much flatus.

Nux mosch.—Dryness in mouth and tongue; stool slow and difficult.

Nux vom.—Flatulence.

Opium.—Sleeplessness.

Phos.—Blood with the stool.

Phosph. acid.—Flatulency; stool hard.

Plumbum.—Constipation, with colic; stools composed of little balls like sheep's dung; flatulency; colic.

Pulsatilla.—Bloody stool.

Sepia.—Stool difficult; flatulency, with loud rumbling in the abdomen.

Diarrhœa.—This is a less frequent complication of the pregnant state. Simple looseness deserves no particular attention; but frequent, watery, painful movements should be checked, as a continuance of them is liable to excite strong uterine efforts at expulsion. Light food, taken in small quantities, and repose of body and mind, ought to be prescribed.

Pregnant women are exposed to the same influences which occasion diarrhœa in the non-pregnant, and, in mentioning a few remedies, we would not be understood as regarding them peculiarly suited to diarrhœa during pregnancy, though we have found them very serviceable for it. They are named in the order of their usefulness.

Aloes.—Feeling as if the stool could not be retained, but must drop involuntarily; rumbling in the bowels; generally good appetite.

Alumina.—Tenesmus; stools bloody and scanty; urine can be passed only with the stool.

Arsenicum.—Bloody or involuntary stools; very weak, least motion causing great fatigue; worse after eating or drinking; great thirst.

Bryonia.—Much better when quiet; thirst; worse when the weather becomes warmer.

Chamomilla.—Nightly diarrhœa with colic; very irritable temper; stool small, frequent, smelling like rotten eggs.

Chelidonium.—Stools pasty or watery, bright yellow; lighter colored than usual; light red or brown. Patient craves hot drinks.

China.—Stools contain undigested food; yellowish; painless. Diarrhœa worse at night, after eating and at night.

Colocynth.—Pappy stools, with or without burning at the

anus; may be preceded by colic; sometimes tenesmus; stools yellow, brown, bloody or greenish.

Dulcamara.—Diarrhœa worse after every cold change in the weather.

Gelsemium.—Diarrhœa arising from depression or anxiety of mind.

Hyoscyamus.—Frequent, slimy stools; yellow watery, painless

Ipecac.—Greenish stools, accompanied by much nausea.

Kali carb.—Stools profuse, with much weariness or severe pain in lower part of abdomen; insufficient.

Mercurius.—Stools greenish, bloody, slimy, corrosive; tenesmus and frequent urging; perspiration.

Phosphorus.—Stools watery; general debility.

Veratrum alb.—Stools profuse, watery; cold perspiration; colic before movement.

Vesical Irritation.—Vesical disturbances are common during pregnancy. They are more marked during the early and the latter parts of the term: the former due chiefly to hyperæmia of the pelvic organs which characterizes that stage of gestation, and the latter proceeding in great part from the mechanical compression exerted at that time. The symptoms are frequent desire to urinate, with pain, burning, and sometimes itching.

If the ailment becomes distressing, and treatment proves unavailing, an examination per vaginam should be made, and if the difficulty proves to owe its existence to mechanical causes which can be remedied, careful interference may be practiced. When there is nothing more than irritation, and the desire is frequent and distressing, we have often used a steel sound, of as large size as the meatus can easily receive, with excellent effect.

Treatment.—This ailment is sometimes so distressing that we feel justified in giving here a brief repertory of symptoms:

DISCHARGE OF URINE.

Difficult, *acon., alum., apis, arg. n., arn., ars., aur., benz. ac., cactus, camph., can. ind., can. sat., caps., crot., dulc., erig., eup. purp., gels., helon., hepar s., hyos., lith. c., lyc., mag. m., meph., merc., mur. ac., nat. m., nit. ac., nux m., opium, pareira, plumb., ran. b., rheum, rhus t., secale, sepia, stram., sulph., tereb., thuja, zincum.*

From atony, *camph., opium, rheum, secale, thuja.*

From cold, cold drinks, *dulc., nit. ac.*

From spasmodic contraction of the neck of the bladder, *hyos.*

After dinner and supper, *nux m.*

After exertion, *nux m.*

All day, *meph.*

Especially in the morning, *sepia.*

DISCHARGE OF URINE—CONTINUED.

With pain and heat, *nit. ac.*
With urging to stool, *nux m.*
Can pass only by straining at stool, *alum.*
Must press so that anus protrudes, *mur. ac.*
Alternate dysuria and enuresis, *gels.*
Diminished, *hyper., kreos., led., lob., mex., pod., rhus, sab., senega, stram., sulph. ac.*
Dribbling, *agar., arn., benz. ac., brom., bry., can. ind., caust., kali brom., nux v., petr., plumb., selen., spig., stram.*
During motion, without sensation, *bry.*
At beginning of stool, *kali b*
After stool or urine, *selen.*
After urinating, *can. ind.*
With burning after urinating, *brom.*
With burning at meatus, *spig.*
No pain, *sars., stram.*
In spite of urging no stream forms, *stram.*
In Drops, *acon., apis, arn., bry., cactus, camph., canth., caust., clem., colch., dros., dulc., eup. purp., hell., lachn., merc., merc. c., nux m., nux v., plumb., puls., rhus, sabina, sars., sep., spig., staph., stram.*
Sensation as if drops came from bladder, *sep.*
When moving, without sensation, *bry.*
When sitting, *puls.*
When walking, *puls.*
With frequent desire, *apis, eup. purp.*
With much burning, *cactus, nux v.*
With great pain, *merc. c.*
With tearing, *nux v.*
Increased, *acet. ac., acon., agn., amb., berb., calc. p., carbo a., carbo v., caul., cic., cina, colch., eup. purp., euph., hell., hyd., kali j., kob., led., lil., lob., mag. c., nicc., marum., merc. j. r., merc. c., nat. m., phos., puls., rheum, rhod., senega, squill., tell., ther., ustil., valer., verat. v.*
With headache and profuse sweat; vomiting, *acon.*
With sense of weakness, *calc. p.*
With unquenchable thirst, *kali j.*
With thirst for large quantities, *nat. m.*
With sweat on head, hands and feet, or forepart of body, *phos.*
Interrupted, *carbo a., clem., con., led., meph., op.*
With burning during the interruptions, *clem.*
From spasm at neck of bladder, *op.*
Painful, *acon., æsc., apis, aur., bapt., calad., camph., can. ind., can. sat., canth., caps., crot., dulc., orig., eup. purp., fluor. ac., gels., hell., helon., lith. c., lyc., mag. c., merc. c., mur. ac., nat. c., nat. m., nat. s., nit. ac., nux m., nux v., olean., pareira, plumb., ran. s., sab., sars., tereb.*
After cold drinks, *dulc.*
Dinner and supper, *nux m.*
Exertion, *nux m.*
Jolting ride, *eup. purp.*
Alternating with enuresis, *gels.*
Irritating, *sars.*
Very, *eup. purp., pareira.*
With heat, *nit. ac.*
Micturition, vomiting and purging from spasmodic contractions, *crotal.*
Profuse, *acet. ac., act., æth., agar., aloe, alum., amm. c., amm. m., arg., ars., aur., bary. c., bell., bis., bry., cact., calc. p., can. ind., cepa, chel., cic., coff., col., cycl., crotal., dros., erig., eup. perf., eup. purp., euph., ferr., gels., glon., guai., ham., hell., helon., ign., iris, kali b., kali c., kali j., kalm., kreos., lith. c., mang. acet., merc. j. fl., mez., mur. ac., nat. a., nat. m., olean., oxal. ac., phos., phos. ac., phyt., rumex, sab., samb., sang., sars., selen., sil., spig., stan., staph., stram., sul., tarax., tereb., thuja, verat. a., vibur., xanth.*
During night, *amm. m., arg. m. bary. c., phos. ac., sang., sars., stram., sulph.*

DISCHARGE OF URINE—CONTINUED.

Disturbing sleep, *lith. c.*
In afternoon, *rumex.*
In morning, *ambra, mez.*
Followed by dull pain in region of kidneys, *ambra.*
Nervous affections, *alum.*
Nervous women, *xanth.*
Spasms, *stram.*
Passed without sensation, *sars.*
Pale, *eup. perf.*
Relieving backache, *gels., lyc. sil.*
Very often, *euph.*
Very profuse, *eup. purp., hell.*
With frequent discharge, *ars.*
Headache, *verat. a., vibur.*
Hysteria, *sulph.*
Sense of weakness, *calc. p., ferr.*
Thirst for large quantities, *nat. m.*
Retained, *acon., apis, apoc., arn., ars., arum, aur., bell., benz. ac., camph., canth., caust., cic., dulc., ham., hell., hepar, hyos., illic., laur., millef., op., puls., rhus, ruta, sab., sec.*
After exertion, *arn.*
From atony, muscular, *hell.*
Cold, *acon.*
Contraction of sphincter, *op.*
Exertion, *arn.*
With backache, *rhus.*
Constipation, *canth.*
Pain, *canth., ruta, sars.*
Pressure in bladder, *acon.*
Scanty, *abrot., acon., act., æsc., ailan., aloe, alum., ant. t., apis, apoc., arn., ars., arum, aur., bapt., bell., berb., brom., bry., camph., canth., card. mar., cham., china, clem., cocc., colch., crotal., cup., cycl., dig., dros., dulc., eup. perf., eup. purp., fluor. ac., graph., ham., hell., hyos., hyper., ipec., iris, kali b., kali brom., kali c., kob., lil., lith. c., lyc., merc. j. fl., merc. c., mur. ac., myrica, nat. s., nit. ac., nux m., op., petr., phos., phyt., psor., ptelea, puls., ruta, sang., sars., selen., squill., stann., staph., tereb., ustil., verat. a., verat. v.*
With no uneasiness, *apoc.*

WHEN NOT URINATING.

Burning pain in forepart of urethra, which compels to urinate, *can. sat.*
Cutting in urethra between micturition, with frequent urging, *mang. acet.*
Cutting and stinging in urethra, *caps.*
Fleeting pain in bladder, *benz. ac.*
Pressure in forepart of urethra as if to urinate, *can. sat.*
Stitches along urethra, *can. sat.*

BEFORE URINATING.

Aching in back, ameliorated by urinating, *lyc.*
In bladder, *fluor. ac.*
Bladder, aching in, *fluor. ac.*
Burning in, *fluor. ac., rheum.*
Bladder, burning in and cutting, from neck of to fossa navicularis, *canth.*
Pain in region of, *phyt.*
Worse in right, flashes of, *lith. c.*
Pressure on, *nux v.*
Burning in kidneys, *rheum.*
In bladder, *can. ind., canth., clem., fluor. ac., rheum.*
In bladder, from neck to fossa navicularis, *canth.*
In urethra, *can. ind., can. sat., canth., clem., fluor. ac.*
Cutting from neck of bladder to fossa navicularis, *canth.*
Kidneys, burning in, *rheum.*
Pressure on bladder, *nux v.*
Stinging in Uretha, *can. ind.*
Ureters, violent pain in direction of, *chel.*
Urethra, burning, *can. ind., canth., clem., fluor. ac.*

DURING URINATION.

Abdomen, pain in lower, *agn.*
Aching of back, *ant. c.*
Anus prolapsed, *mur. ac.*
  Constriction of neck of, *cactus.*
  Pain in, *ant. t., phyt.*
    Violent, *ant. t.*
  Pressure in, *lachn.*
  Smarting and burning in, *eup. purp.*
  Spasm in, *asaf., op.*
    Interrupting flow, *op.*
  Stitches in, *nat. m.*
  Tenesmus of, *lith. c.*
  Throbbing in neck of, during straining to urinate, *dig.*
Burning in kidneys, *rheum.*
  In bladder, *cham., eup. purp., rheum.*
    And smarting, *eup. purp.*
    Neck of, *canth., cham.*
      And cutting to fossa navicularis, *canth.*
  In urethra, *acon., aloe, ant. c., ant. t., arg. n., ars., bapt., cact., calc., can. ind., can. sat., caps., carbo an., caust., cham., clem., eup. purp., glon., helon., hepar, ign., kali b., kali c., lachn., mag. c., merc. c., mur. ac., nat. c., nat. m., nat. s., nicc., nit. ac., nux m., nux v., psor., rheum, sab., staph., thuja.*
    And soreness, *carbo a.*
    With gonorrhœa, *thuja.*
    With discharge of urine in drops, *cact.*
  In meatus urinarius, *can. sat., cinch., puls., sep., sulph.*
    And smarting backwards, *can. sat.*
    During bloody urine, *puls.*
Chills, rigors, *stram.*
Constriction of neck of bladder, *cact.*
Cutting in urethra, *ant. c., caust., guai., mur. ac., nux m., op., psor.*
Hæmorrhoids protrude, *kali c.*
Kidneys, burning in, *rheum.*
Meatus urinarius, burning at, during bloody urine, *puls.*
  Itching at, preceded by urgent desire, *petr.*
Pain in hips, *berb.*
  Thighs, *pareira.*
  Kidneys, *agn.*
    Burning, *rheum.*
  Bladder, *ant. t., phyt.*
  Urethra, *calad., lith. c.*
Pain in urethra at meatus, *zing.*
  Glans penis, *oxal. ac.*
Pressure in bladder, *lachn.*
Prolapsus ani, *mur. ac.*
  Recti, *valer.*
Rigors, *stram.*
Shuddering along spine, *nit. ac.*
Smarting and burning in bladder, *eup. purp.*
  In urethra, *colch., eup. purp., graph., ign., kob., mag. c., merc. c., nat. m., nit. ac., ptelea, sep.*
  Of vulva, *nat. m.*
Soreness in urethra, *carbo a., hepar, ign.*
Spasm in bladder, *asaf.*
  In neck of, interrupting flow, *op.*
Stitches in bladder, *nat. mur*
  Urethra, *can. sat., graph.*
Stool, *ailan., aloe, alum., canth., mur. ac., squill.*
  Urging to, *aloe, alum., canth.*
Straining and prolapsus recti, *valer.*
Tearing in urethra, *nux v.*
Tenesmus of bladder, *lith. c.*
Thighs, pain down, *pareira.*
Throbbing in neck of bladder during straining to urinate, *dig.*
Urethra, burning, *acon., aloe, ant. c., ant. t., arg. n., ars., bapt., cact., calc., can. ind., can. sat., caps., carbo a., caust., cham., clem., eup. purp., glon., helon., hepar, ign., kali b., kali c., lach., mag. c., merc. c., mur. ac., nat. c., nat. m., nat. s., nicc., nit. ac., nux m., nux v., psor., rheum, sab., staph., thuja.*
  Cutting, *ant. c., canth., guai., mur. ac., nux m., op., psor.*

DURING URINATION—CONTINUED.

Smarting, *colch.*, *eup. purp.*, *graph.*, *ign.*, *kob.*, *mag. c.*, *merc. c.*, *nat. m.*, *nit. ac.*, *ptelea*, *sep.*
As if raw, *colch.*
Stinging, *can. ind.*
Urethra, stitches, *can. sat.*, *graph.*
Tearing, *nux v.*
Urging and prolapsus recti, *valer.*
Varices protrude, *kali c.*
Vulva, smarting and soreness, *nat. m.*

AFTER URINATION.

Aching of back, relief after, *lyc.*
Bladder, aching in, *fluor. ac.*
Sense of fullness continues, *dig.*, *eup. purp.*, *ruta*, *staph.*
Spasmodic in neck of, extending to thighs, *puls.*
Burning, *ant. t.*, *brom.*, *can. sat.*, *canth.*, *caps.*, *con.*, *fluor. ac.*, *iris*, *kali b.*, *kali c.*, *led.*, *mag. m.*, *nat. c.*, *nat. m.*, *staph.*
And cutting from neck to fossa navicularis, *canth.*
With dribbling, *brom.*
Cutting, *canth.*, *lyc.*, *nat. m.*
Desire continues, *berb.*, *bov.*, *senega*, *stann.*, *staph.*
Fullness in bladder, sense of, continues, *dig.*, *eup. purp.*, *ruta*, *staph.*
Even after frequent urination, *eup. purp.*
And feeling as if moving up and down at every step, *ruta.*
Headache, relieved by profuse urination, *gels.*, *sil.*
Jerking and cutting in urethra, *lyc.*
Lancination in abdomen, relief from, *carbo a.*
Pain, severe, *sars.*
Spasmodic, in neck of bladder, extending to thighs, *puls.*
Sexual organs excited and sense of weakness, *berb.*
Shooting to abdomen, *tarax.*
Soreness in urethra, *carbo a.*, *hepar*, *ign.*
Spasmodic pain in neck of bladder, extending to thighs, *puls.*
Spasm of bladder, *asaf.*
Stitches and lancination in abdomen, relief from, *carbo a.*
Urethra, burning, *ant. t.*, *brom.*, *can. sat.*, *canth.*, *caps.*, *con.*, *fluor. ac.*, *iris*, *kali b.*, *kali c.*, *led.*, *mag. m.*, *nat. c.*, *nat. m.*, *staph.*
In glandular portion, continuing long after, *kali b.*
Cutting, *canth.*, *lyc.*, *nat. m.*
Drop remained, sensation as if, *arg. n.*, *kali b.*
Running down, *thuja.*
Jerking, *lyc.*
Smarting, *borax*, *caps.*, *lil.*, *ptelea.*
Stinging, *can. ind.*
Stitches, *kali b.*
Straining, *mur. ac.*
Tenesmus, *mur. ac.*, *nit. ac.*
Urging, *mur. ac.*, *nit. ac.*
Urging continues, *berb.*, *bov.*, *senega*, *stann.*, *staph.*
Urine were still flowing, sensation as if, *vibur.*
Weakness and dullness relieved after, *tereb.*
Sense of, and excitement of, *berb.*

Cough.—In addition to the more common diseases of the respiratory tract, from which pregnant women are not exempt, there is a spasmodic cough, doubtless of reflex origin, which sometimes proves most distressing. It bears a resemblance to whooping-cough, and may become so violent, and the paroxysms so frequent, as to excite abortion.

Aconite for a few days, followed by *nux vomica*, has proved efficacious. If the cough is worse in the evening and night, *belladonna*. If attended with vomiting, *ipecac*. *Cimicifuga* and *sepia* are sometimes indicated. Other remedies are *bryonia*, *phosphorus* and *conium*.

Dyspnœa.—Oppressed respiration, not always amounting to real dyspnœa, may arise from reflex causes, but real difficulty of breathing most frequently proceeds either from upward pressure of the uterus, or from heart disease.

When it is clearly a reflex condition, *moschus*, *nux moschata* and *lobelia* are likely to afford aid. *Nux vomica* in these and other cases, on special indications, will be found of service. When dependent on heart disease, *strophanthus*, *digitalis* and *cactus* are better remedies. We have recently given great relief in a case of mitral insufficiency, by the use of *spongia*.

Sleeping with the head and shoulders elevated will be found to have an ameliorating effect on the distress.

Hemorrhoids.—Pressure of the gravid uterus on the hemorrhoidal veins, accompanied, as it often is, by a loaded rectum, ultimates with facility in the production of piles. Coincidently with this dilatation of the rectal veins, varices in other parts, such as the vulva, vagina and lower extremities, are often observed. Distension may become so great as to produce rupture, giving rise to vaginal or vulvar thrombus or hematocele, a condition which will be described in another place. The hemorrhage resulting from such an accident is sometimes profuse.

Hemorrhoids may be kept within bounds, and thus much suffering averted, by securing, without the use of purgative remedies, a daily movement of the bowels. Much can be done to favor this, as observed under the head of "constipation," by regular efforts at stool.

Belladonna.—Piles so sensitive that the woman cannot bear to have them touched ever so lightly; the back feels as though it would break; throbbing headache.

Aloes.—The piles protrude, and are not and sore, attended with bearing-down sensations.

Hamamelis.—Bleeding hemorrhoids, with burning, soreness, fullness and weight, with tendency to rawness. The local use of the aqueous extract is very beneficial.

Nux vomica.—Is of greatest service to women of sedentary habits, and those who have been accustomed to the use of cathartics.

Sepia.—The piles come down with even a soft stool; feeling of bearing and straining in the rectum; oozing of moisture from the rectum; soreness between the nates.

Sulphur.—It is suitable to piles of all descriptions, and should be given when any of its general characteristic symptoms are found.

Collinsonia.—This is one of the best remedies. Sensation as of sticks, sand or gravel, in the rectum. Worse in the evening, better in the morning.

Æsculus hipp.—Blind and painful hemorrhoids, sometimes slightly bleeding; severe pain across the back and hips; feeling as of a stick in the rectum.

Other remedies sometimes required are, *aconite, apis, alumina, calcarea carb., graphites, leptandria, nitric acid, pulsatilla.*

An operation for radical cure of hemorrhoids during gestation is not advisable; but should they remain permanently protruded after the puerperal period has passed, they may be excised, with proper precautions, or otherwise cured.

Varices.—The veins of the lower extremities, in certain women, become varicose, and sometimes painful. When this is true, an elastic stocking gives considerable comfort.

A varicose condition of the vulva can be kept in check by the moderate pressure of a soft pad held by a T bandage.

CHAPTER XI.

DISEASES OF PREGNANCY—Continued.

Displacements of the Gravid Uterus.—The gravid uterus is liable to displacement, and the occurrence forms one of the serious complications of pregnancy.

ANTEVERSIONS AND ANTEFLEXIONS.—There is much to be found in homeopathic literature on this subject, and one would be led to suppose that it is not only a common occurrence during pregnancy, but that it is a frequent and serious complication of labor. This error proceeds from a want of clear comprehension of the normal inclination of the longitudinal uterine axis. The plane of the pelvic brim lies at an angle of about 60° with the horizon, and it is generally supposed that the long uterine axis is coincident with, or lies parallel to, the axis of this plane, which would give the fundus uteri, as is seen in the figure, an inclination forward more marked than many suppose. The normal anteversion of the impregnated uterus is, at first, sometimes exaggerated by the increased weight of the gravid uterine body, but the deviation is usually rectified by the gradual development, and upward movement, of the organ. In rare cases the deviation continues after the fourth month, and produces tenesmus of the bladder, dysuria, or incontinence. The condition, when once recognized, is readily overcome with, or without, an abdominal supporter. A pessary would be of no service.

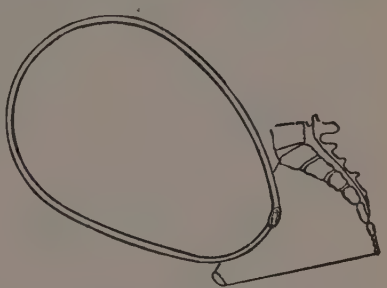


FIG. 121.—Relative size and inclination of the Uterus at the close of Gestation.

A similar position of the uterus in late pregnancy forms what is known as pendulous abdomen, which is referable to inadequate abdominal support, proceeding from relaxation of the parietes, separation of the recti muscles, or to the cicatrices left from operations or injuries. Curvature of the spine, and contracted pelvis, favor its production. Cases are on record wherein the recti muscles were separated, and the uterus was

anteverted between them, covered only by fascia and integument, nearly to the knees.

Treatment clearly consists in the reduction of the displacement, and the application of a firm abdominal bandage.

RETROVERSION.—This is now regarded as a comparatively infrequent form of uterine displacement during pregnancy, and when spontaneous rectification does not occur, the development of the organ forces it into a flexed condition.

RETROFLEXION.—This is an uncommon occurrence in women for the first time pregnant. It may arise during pregnancy

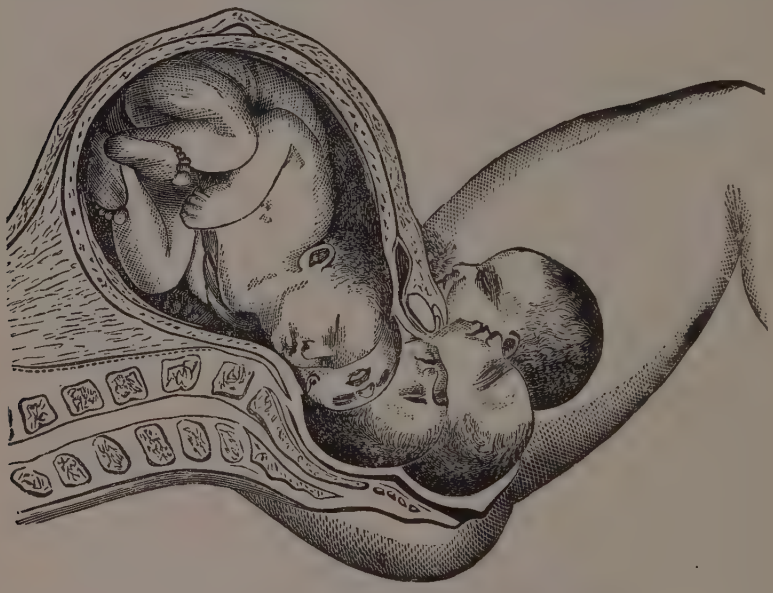


FIG. 122.—Retroflexion of the Gravid Uterus.

from the same causes which produce it in the non-pregnant state, such as a fall, or undue distension of the bladder and rectum; but sometimes it is doubtless due to displacement of the organ which antedates conception.

With the advance of pregnancy the uterus generally straightens and clears the pelvic brim, without serious inconvenience. This spontaneous rectification is not so apt to occur in chronic cases as in recent ones, because tissue tonicity is greatly impaired. In many cases the fundus does not ascend above the sacral promontory at the usual time, but remains incarcerated in the pelvic cavity, when the condition which was,

perhaps, at first, one of retroversion, now becomes partial retroflexion, by means of which the uterine cavity is divided into diverticuli or pouches—an anterior and a posterior.

The symptoms of incarceration embrace dysuria, or even complete retention, vesical tenesmus, incontinence of urine, painful defecation, constipation or obstipation, severe sacral and lumbar pains extending into the thighs. In grave cases, emesis, and all the other symptoms of ileus, may be developed. At any time during incarceration, abortion may occur, followed by relief of the threatening symptoms; but should it persist, metritis, parametritis and peritonitis may ensue with fatal result. Death may also result from pathological processes set up in the bladder by retention and decomposition of urine. These are cystitis and gangrene, which, in turn, give rise to septicæmia or vesical rupture. The retention may lead to uræmic poisoning, and thus to death.

The diagnosis of retroflexion and incarceration of the uterus is not often difficult. As the physician passes his finger along the vagina, in order to reach the os uteri, he will find that it impinges upon an elastic swelling along its posterior and superior border, lessening and changing the course of the latter, and if pregnancy be advanced to the fourth or fifth month, completely filling the cavity of the lower, or true pelvis. The cervix uteri, if discovered, will be found behind or above the posterior or inner face of the symphysis pubis. On abdominal examination, the fundus uteri cannot be felt above the pelvic brim. By bimanual examination, the alternate relaxation and contraction of the gravid uterus can be made out, and differentiation thus made between the body and fundus of the uterus and a swelling of a different kind in the same situation. The clinical history of the case will also give important data.

The distinction between an incarcerated uterus and an extra-uterine pregnancy is sometimes difficult, necessitating a thorough and careful bimanual examination, aided, in cases of abdominal tenderness, by the employment of an anesthetic.

Treatment.—In these trying cases delay is dangerous, owing to the progressive increase in size of the uterus, and the pernicious effects of long-continued pain and physical disturbance. The object to be held in view, is a return of the fundus uteri to a situation above the pelvic brim. But before attempting the operation there are certain preliminaries to be observed, the

first of which is thorough evacuation of the bladder and rectum. For the purpose of drawing the urine there is no instrument superior to the soft rubber catheter, of small size, as the urethra is too greatly altered in its course and calibre by the compression to which it is subjected to admit of the safe use of a stiff catheter. Even with this instrument we may sometimes utterly fail, in which case puncture of the bladder, if distension exists, may be practiced above the symphysis pubis by means of a small needle of the aspirator.

Another preliminary to the operation in cases of real uterine incarceration is the induction of anesthesia, and the placing of the woman in the Sims' latero-prone position. The knee-chest position should be prescribed if no anesthetic is used. The operation itself is performed by introducing four fingers into the rectum, and pushing upwards on the fundus uteri. Dr. Barnes recommends turning the fundus to one side, so as to avoid the sacral promontory. Repeated efforts may have to be made to achieve complete success. Mere evacuation of the bladder and rectum, and the influence of gravity brought to bear through the assumption of the knee-elbow, or knee-chest position, will be adequate in some cases to bring about complete reduction. This result may be still further promoted by retraction of the perineum with the fingers or by Sims' speculum, and the admission of air into the vagina.



FIG. 123.—Soft rubber Catheter.

An instrument has been devised by Dr. H. N. Guernsey, which serves an admirable purpose in the accomplishment of difficult reduction. It consists of a curved rod of steel, upon the end of which is a hard smooth ball, about three-fourths of an inch in diameter. The instrument is provided with a suitable handle. "As soon as a case of this form of displacement is clearly diagnosed," says the Doctor, "if the urine or fæces are retained, the usual means should be at once adopted for their evacuation. The patient should then be placed on the bed,

near its edge, upon her knees and elbows, so that the force of gravity may assist in the reduction. The ball of the instrument, well lubricated, is to be brought to the anus, with the convex surface of the rod upwards, then gently pressed till within the sphincter, when the handle should be slightly elevated, so as to bring the ball against the anterior wall of the rectum. The instrument is now to be firmly and carefully pressed up the rectum, when the ball will elevate the fundus, care being taken to raise the handle of the instrument more and more as progress up the rectum is made; and presently the uterus will regain its normal position immediately posterior to the symphysis pubis."

It has been recommended that a Hodge pessary of large size be introduced into the vagina, after reduction of the dislocation, and allowed to remain until the uterus has reached a size which precludes the possibility of a return to its former position. Others advise simple lateral decubitus, without the use of a pessary. The after-treatment includes also careful attention to the bladder and rectum, neither of which should be permitted to become loaded.

It occasionally happens that replacement of the uterus is prevented by inflammatory adhesions, or by the secondary swelling of the displaced organ, in which case the induction of abortion is the only recourse. Mechanical obstacles to the ordinary methods of arousing uterine action are here met, and the accomplishment of the object in a tolerably safe manner will tax one's ingenuity and skill. The introduction of a uterine sound, or a flexible catheter, is rarely practicable. Dr. P. Müller, in a case of complete retroversion, resorted to the following ingenious expedient, a knowledge of which may be of benefit to others. He cut off the end of a male silver catheter, and after having bent the extremity, he hooked it within the cervix uteri, which was looking upwards and forwards. Through this artificial channel he passed a piece of catgut, and left it between the membranes and uterine wall. In twelve hours the fœtus was expelled. If our efforts to pass a foreign, but innocuous, substance within the uterus prove unavailing, the organ may be punctured through the vagina with an aspirator needle, or a fine trocar, and a portion of the liquor amnii withdrawn, with but slight risk to the woman, if done under strict antiseptic precautions. This is a sure method of bringing on abortion.

PROLAPSE OF THE UTERUS.—We have already directed attention to the normal descent of the gravid uterus during the early weeks of gestation; but we have now to mention the descent beyond the physiological bounds there described, when it becomes pathological. Hüter, who, in 1860, collected all the recorded cases, makes the following division:

1. The gravid uterus being prolapsed, reduces itself during the first months, and pregnancy and labor follow their usual course: 5 cases.

2. The prolapse is not spontaneously reduced. Its artificial reduction and support must be undertaken: 8 cases.

3. Reduction cannot take place, because of incarceration: 3 cases.

4. The prolapse causes labor before term: 7 cases.

5. Prolapse occurs in the second half of pregnancy, and persists to term and during labor: 3 cases.

6. Prolapse occurs just before or during labor as term. In such a case, prolapse may not have existed prior to labor, or, if it did exist before, was spontaneously reduced during early pregnancy; or the prolapse was reduced and the uterus supported by a pessary: 16 cases.

7. Prolapse occurs during pregnancy and labor: 15 cases.

8. Prolapse existed before impregnation, but became pronounced during labor: 16 cases.

These give a total of 73 cases.

In women predisposed to prolapsus, the condition is easily brought about in the early weeks of pregnancy. In those cases wherein prolapsus existed before impregnation, the condition may not only continue, but become aggravated during early gestation. It is found to exist more frequently in multigravidæ in whom the process of uterine involution after former labors had not become complete. A prominent exciting cause is traumatism, under the power of which great strain is put upon the natural uterine supports.

The disturbances to which this sort of displacement gives rise, vary in severity and character with the stage of pregnancy at which it occurs. Should the condition remain unrectified, the bladder and rectum become irritated, and there is a feeling of weight in the anus, and of painful tractions in the groins, lumbar region and umbilicus. A fœtid discharge is set up, change of position does not relieve the suffering, and a state of

marasmus is liable to supervene. An intensification of these symptoms goes on until abortion ensues.

Procidentia is sometimes simulated by cervical hypertrophy. When this involves the intra-vaginal portion, the elongated neck may, from its mere length, be forced downwards to such an extent, that the os will lie between the labia, and there be subjected to constant friction and atmospheric irritation. The result can easily be predicted. In view of the prognosis under these circumstances, and considering the prejudicial influence which such a pathological state would naturally have on the woman's general health, as well as the pregnancy itself, cervical amputation has sometimes been practiced, without interruption of pregnancy.

Prolapsus usually rectifies itself as pregnancy advances; but it may, in many cases, be thought best to elevate the womb from time to time with the finger, but always in a most gentle manner. Such treatment, if followed by a season of rest in bed, will be found most serviceable.

When prolapse is complicated by vesical distension, it may be necessary to use the catheter for temporary relief; but this instrument ought to be discarded if simple expedients can possibly be made to accomplish the desired end.

When the developing uterus becomes incarcerated in the pelvic cavity, in a state of prolapse, the condition is somewhat like that of incarceration with retroversion or retroflexion. If unrelieved, abortion is sure to ensue, and therefore reasonable, but not violent, attempts should be made to push it above the pelvic brim. If such efforts are not attended with success, abortion ought to be artificially induced before the tissues have been long compressed.

Cardiac Diseases.—We have elsewhere noted the circulatory changes incident to pregnancy, prominent among which are alterations in the relative constituents of the blood, the fibrin being increased and the red corpuscles diminished, while the total quantity of blood is greatly augmented. We should here allude also to cardiac hypertrophy and increased arterial tension. Accordingly we are not surprised to observe that pregnancy appears to hasten the development of cardiac lesions. The latter vary in seriousness with their form. Myocarditis interferes with the development of cardiac hypertrophy, compensatory for the increased blood supply and, in some instances, pre-existing valvular lesions. Endocarditis shows a

strong tendency to assume the fatal ulcerative form, while pericarditis has no marked effect on the normal course of utero-gestation. The chief danger in these cases lies in the direction of interference with the necessary hypertrophy which pregnancy imposes; while another element of danger is found in the rapidly changing degrees of vascular pressure brought about during labor, by intermittent uterine and general muscular action.

The early weeks of pregnancy are comparatively free from indications of cardiac disturbance; but when once developed it rapidly augments in intensity, and the woman thus afflicted rarely goes to term. The distressing symptoms point to pulmonary congestion and œdema,—occasionally to pneumonia and pleurisy. The most serious valvular lesions, here, as in the non-pregnant state, are 1. Mitral stenosis, and 2. Aortic insufficiency. In those cases wherein the pathological conditions have developed during pregnancy, when once the disabled heart has weathered the storm of parturition, the abnormal symptoms usually subside; but, when pregnancy has merely aggravated pre-existing disease, the patient is extremely liable to sink during the puerperium. This latter clinical fact was recently made peculiarly impressive to us by the death of a patient, three days after delivery of two seven-months fœtuses, in whom there was decided tricuspid insufficiency.

Women who are the subjects of serious cardiac lesions ought not to be encouraged to marry.

The existence of pregnancy will not materially modify the treatment of these cases. The patient must have plenty of fresh air and good food, but excesses in both should be scrupulously avoided.

In our medication we should select remedies mainly from among the antipsorics, and the patient's early history should be carefully scrutinized for indications.

These diseases constitute no contra-indications for the use of anesthetics, though they ought to be given with unusual caution.

Eruptive Fevers.—MEASLES is infrequent, not more than two-score of cases having been reported. In those instances where they did not appear, they manifested a strong tendency to become hemorrhagic, and to excite metrorrhagia which terminated fatally to both mother and child. Pneumonia is a frequent and dangerous complication. Abortion nearly

always takes place. The mortality arising from this disease is high; but attacks occurring in the early months are not as dangerous as those encountered at a later period.

Variola, among eruptive fevers, is the most frequent and dangerous of them all. The dangers arising from an attack are augmented as the woman advances in pregnancy, hence we may regard it as a fortunate clinical fact that the disease shows a preference for the early months. The ordinary perils of such an attack are here increased by a strong tendency to abortion and profuse hemorrhage. The disease itself may, after abortion, assume a hemorrhagic type. The more severe forms of the disease prove almost invariably fatal to both mother and child. In one series of twenty-nine cases of all degrees of severity, tabulated by Meyer, five died and nine aborted. In another series of forty-seven cases, eighteen died and twenty-two aborted. When the disease assumes a mild, or discrete, type, its course is generally favorable, though abortion often ensues.

Scarlatina.—Cazeaux never saw a case of this disease in a pregnant woman. Olshausen, after thorough search, was able to collect only seven cases while he found one hundred and thirty-four in puerperæ. A striking peculiarity of the disease as it appears in connection with the pregnant state, is its long period of incubation. The disease, under other conditions, displays peculiar whims in this respect; but, in some instances where it has appeared in pregnancy and puerperality, the lapse of time between exposure and development has been astonishingly great. For instance, a woman in the early months may be exposed to the contagion, and temporarily escape its baneful influence at the time only to fall a prey to the disease in the puerperal state.

As a result of the disease in pregnancy, miscarriage always takes place, and, in the larger number, death ensues.

Apart from the management of threatened or accomplished abortion, the disease requires treatment, differing in no essentials from that of other cases.

Continued Fevers.—Typhoid.—Pregnancy does not exempt from attacks of the various continued fevers, nor does it seem seriously to modify their course, save in the one particular of added miscarriage. Out of seventy-two cases of typhoid fever, sixteen aborted; and out of sixty-three cases of relapsing fever, pregnancy suffered interruption in twenty-three.

As in the eruptive diseases, so here, these fevers are more likely to attack women in the early part of the term. Fœtal dangers, arising through abortion, are sufficiently expressed in the figures just given; while the maternal perils are increased chiefly by the abortion which is so liable to ensue. In serious types of the diseases, danger is augmented by the uterine hemorrhage which may occur without immediate interruption of pregnancy.

No special observations concerning treatment are necessary, excepting to notice the unusual demand for the tampon in view of the greater danger of excessive hemorrhage, and the increased difficulty of controlling it.

MALARIAL.—The revulsive effect of pregnancy brings out latent dyscrasiæ and lurking poisons, malaria among the number; yet the organism, at such a time, does not seem to be a fertile soil for its development. When malarial symptoms are manifested, their paroxysms assume either an anticipating or a retarding tendency, being very irregular in appearance. Rarely the type is pernicious in character. Even though protracted in its stay, malarial fever seldom results in abortion. When labor supervenes during the fever, the paroxysms may be temporarily interrupted, only to return a few days postpartum. The interruption is not infrequently for a longer period.

Arsenicum.—This remedy is one of the most valuable, especially in cases of ancient infection. We find it peculiarly suited to the irregular type of the disease.

Natrum m.—In the 30^{x} trituration, we have found this a most effective remedy, especially when the paroxysm occurs in the forenoon.

Pulsatilla.—When the paroxysm comes on late in the afternoon, or in the evening; not well marked in all its stages; temperature does not mount to a great height; and there is little thirst.

China.—From this remedy in potency, we have observed no special effect; but there are cases, especially those of recent origin, which seem to demand quinine in appreciable doses.

There are many other most excellent remedies, even a list of which would occupy too much space for insertion in such a work as this. Cases which do not readily respond to the selected remedies, demand special search for a similimum.

Pneumonia.—This is always a serious disease, but doubly so when it occurs during pregnancy. The danger here arises,

not because of a special enfeeblement of the vital forces, or any peculiarity of the constitution during pregnancy; but because of the extreme danger of the added complication of abortion. Among all the inflammations involving the parenchyma or the envelopes of the various organs, no one is so liable to excite abortion as this. Grisolle reported four cases of his own, and collected eleven others, out of which number four aborted a few days after the onset of the disease, and only one escaped serious symptoms.

Pneumonia in pregnancy is unquestionably a remarkably fatal disease. Grisolle reports a mortality of 92.8 per cent.; Rican, 35.8 per cent.; Bourgeois, 7 per cent.; Wernick, 21.1 per cent.; Chetelain, 39 per cent. Dr. George B. Peck, in 1887, collected the experience of nineteen physicians, which showed a mortality, alike for mother and child, of 14.28 per cent. The same statistics, however, establish the comparative infrequency of the disease.

The strong tendency to abortion is probably referable to a combination of causes, among the chief of which are, the hyperpyrexia, the intensity of general reaction and the paroxysms of cough. The cause of maternal mortality has been a moot point, and is not yet fully settled, but it is fairly referable "to coexisting hydræmia, and to the inability of the poorly nourished heart to restore the balance of a pulmonary circulation disturbed by the consolidation of lung-tissue and by the consequent impermeability of large capillary areas." The immediate cause of death is pulmonary œdema.

The induction of premature labor is not to be considered in connection with the management of this disease, since statistics plainly show that it greatly augments the dangers. In Dr. Peck's tables before alluded to, we find that, out of 82 women who suffered miscarriage during the disease, 58 died; while out of 74 who did not abort, only sixteen died. Still, if labor has already begun, it should be hastened as rapidly as may seem advisable. Under judicious homeopathic treatment we look for far better results than have thus far crowned old-school management.

Aconite may be of some service at the very beginning, provided it is indicated by its three prominent symptoms; heat, thirst and restlessness, but not otherwise. We do not sympathize with that practice which prescribes aconite at the beginning of every acute attack of disease accompanied by fever.

Veratrum vir. may likewise afford some aid, provided the attack is violent, the fever high and the pulse hard and bounding.

Bryonia.—This is the remedy from which we may expect the best results, even in the incipiency of the disease. Its provings furnish us with a better picture of the disease than any other in the whole list. It corresponds to the most thoroughly fibrinous nature of the exudation. The fever, the thirst, the sharp pains, worse from movement, and the cough, all constitute good indications for this remedy.

Phosphorus.—"Experience," says Hughes, "has shown that it is difficult to define its sphere of usefulness, and that it may either come in (as Jousset recommends) to renforce *bryonia* when that medicine is not telling, or from the outset when the latter is not specially indicated, with the utmost advantage." When the exudation is being slowly absorbed, and the respiration is still accelerated, the patient complaining of a sense of oppression of the chest, this remedy will do good service.

Arsenicum.—The temperature is elevated, the patient thirsty, restless, and sleepless. Also with a low temperature, and indications of sinking vitality.

Antimonium tart.—Much rattling of phlegm on coughing and breathing, but much difficulty in loosening it. Especially serviceable during the stage of resolution.

Among other valuable remedies are, *belladonna, carbo veg., cuprum, lycopodium, mercurius, sanguinaria,* and *rhus tox.*

Phthisis.—Contrary to the commonly accepted belief, it appears that pregnancy, in the majority of cases, hastens the progress of phthisis, and precipitates its development. The latter is true, of course, chiefly of those women who have an heredity, or a strongly-acquired tendency to the disease. Out of twenty-seven cases collected by Grisolle, twenty-four showed the first symptoms of the disease during gestation; from which, together with other data, we are led to believe that pregnancy does not exert a protective influence against the development of this disease. Ganlard reports thirty-two cases in which the condition was aggravated, and collected eighty-four in which it originated during pregnancy, and was evidently aggravated by it. In advanced stages of the disease women are not susceptible to impregnation. A woman with inherited tendencies to the disease, may escape it in a first, and possibly, second pregnancy, but fall a prey to it during a subsequent gestation.

When those suffering from this disease pass safely through pregnancy and parturition, their vital forces are extremely reduced. They supply but little milk to their children, who are nearly always feeble, poorly-nourished, and who inherit consumptive tendencies. Lebart says that the influence of pregnancy is not only most decided, but his statistics show that inheritance of the disease tendency is strongly marked. Following are his conclusions:

1. Latent tuberculosis in young girls most often appears after marriage as the result of pregnancy.

2. In exceptional cases the health of tuberculous women is not affected even by repeated pregnancies, though in some of these the children are feeble, and a certain proportion die early.

3. Advanced phthisis usually prevents conception. Incipient phthisis does not prevent it, and the pregnancy goes on to term.

4. Abortion, pregnancy and the puerperal state determine the development of phthisis in at least three-fourths of the cases.

5. Children born of phthisical mothers are generally feeble, and often develop scrofulous symptoms and then tuberculosis.

It is fortunate for such women and their offspring that they have little milk, as they are thereby obliged to resort to other sources of nutritious supply for their children, thereby economizing their own remaining strength, and saving their children from imbibing milk poorly calculated to well-nourish and to furnish the necessary elements for future constitutional vigor.

Women possessing tendencies to phthisis should be dissuaded from entering the married state, as their interests, and those of society, will be best subserved by their never becoming mothers.

How much good can be done for such patients is problematical, but during gestation they ought to be well fed, and receive *arsenicum jod., phosphorus, iodium, sulphur,* or other indicated remedies.

Erysipelas.—Idiopathic erysipelas is much more disposed to attack the face than any other part, but even there is comparatively infrequent in pregnancy. We have never seen a case, and few obstetricians have reported examples of the disease. It would appear that pregnancy serves, not as a positive protection against the disease, but as measurably preventive. Its course is not materially altered by the woman's condition,

save in the one particular of the added complication of abortion which is prone to occur and thereby increase the gravity of the prognosis. The fatality is about equal to that of measles.

Treatment of the disease proper is substantially that of cases disconnected with pregnancy.

Belladonna stands in the front rank, being indicated by the cerebral fullness, throbbing headache, elevated temperature, the dermatitis, etc. Heat without thirst we have always found a strong characteristic.

Apis mel.—Swelling and redness of the skin; stinging and burning. Little or no thirst.

Rhus tox.—Part red and swollen, headache, dry mouth and much thirst, symptoms worse at night. The appearance of vesicles on the inflamed surface is a strong indication for this remedy.

Other remedies are, *arsenicum, aconite, mercurius, pulsatilla* and *hepar sulphur.*

Syphilis.—With this disease in pregnancy we have had but little experience, and as the subject is so satisfactorily considered by Charpentier, we quote from him as follows: "All authors agree in admitting the influence of syphilis on pregnancy, and of pregnancy on syphilis; but there is a particular factor which imparts to this mutual influence special forms—the age of the syphilis.

"1. Sometimes a woman is pregnant when she contracts syphilis, and the infection can then occur either at the beginning, during the first months after conception, or during the latter months.

"2. Sometimes a woman becomes pregnant at the same time that she contracts syphilis. The infecting coitus has also been fruitful.

"3. Pregnancy occurs in a woman who is healthy and in good condition, and who has never presented, nor does she then present, any evidence, old or recent, of syphilis, but whose husband has possessed, or still possesses, a syphilitic diathesis.

"4. Pregnancy occurs in a woman affected by syphilis at a time more or less remote; it was not treated, and the woman presents, or does not present, traces of it.

"In the first place, what are the evidences of syphilis most often met with in the pregnant female? According to all the authors who have studied the disease these are especially the

primary and secondary manifestations. The tertiary, on the contrary, are rare. These manifestations are greatly influenced in their course, and in their character, by gestation. This influence of pregnancy is manifested in two ways, either locally, or generally, and both chancres and syphilides are subject to the disturbing circulatory effects which exist in the pregnant woman, and which result in either passive or active congestion. According to Fournier, pregnancy complicates the pox by adding to it its own anæmia, its depressing influence, its neuralgic tendency, disorders of nutrition, etc. As regards the local manifestations, syphilis predisposes to the development of mucous syphilides, which assume great importance. The induration is slightly marked, being a simple hardened scale-parchment chancre; but, while in the non-pregnant woman the duration of the chancre does not generally exceed from four to five weeks (rarely more, often less), in the pregnant female the mean duration of the chancre is about two months and twenty days.

"According to Fournier, mucous papules are not only very common, but they develop in pregnant women a remarkable exuberance, assume rapidly the budding, vegetating, or hypertrophic variety, and often form actual tumors, which invade and distort the entire vulva. Moreover, they are always more rebellious than usual, and disappear more slowly. Syphilitic ulcers are quite frequent in pregnant women; they are livid, of a violet color, excavated, and are rendered still deeper by the vascular turgescence of the parts. They usually persist for a longer or shorter period, and often tend to progress. It is sometimes extremely difficult to cause them to cicatrize before delivery. While the duration of syphilides, in the non-pregnant state, varies from two to two-and-a-half months, it varies from three to three-and-a-half during pregnancy. Guérin, who agrees with Fournier on this point, affirms that during pregnancy the mucous patches increase in number, and grow in spite of general and local treatment as long as the pregnancy continues; or that if they disappear for a short time, they have a great tendency to return, not only on the genitals, but also on the fauces, tongue, and lips. Their persistence, according to him, proves that treatment is not so effective as it is in the non-pregnant condition.

"The Influence of Syphilis on Pregnancy.—Although the influence of syphilis on pregnancy is unquestioned, it is, how-

ever, not absolute, and varies with the conditions according to which syphilis appears in women. The important feature is the frequency of abortion and premature delivery. Among 657 syphilitic females, 231 miscarried, while 426 were delivered at term of living and dead children. But as we have seen, four cases may be presented, and we must consider here:

"The father alone is syphilitic. The mother has never presented, nor does she now present, any manifestations of syphilis. The idea of direct transmission from the father to the fœtus, without participation on the part of the mother, which was opposed for some time, has been defended by Trousseau, Diday, Bourgeois and many others. It remains to-day incontestible, and we have observed numerous cases.

"As regards maternal syphilis, we have seen that (1) the woman may be affected before conception; (2) syphilis and pregnancy may begin simultaneously; (3) syphilis may have been contracted after conception, at a period of pregnancy more or less advanced.

"1. *Syphilis existing Before Conception.*—A syphilitic woman who becomes pregnant is far more predisposed to abortion than a pregnant woman who subsequently becomes syphilitic. This is especially observed in cases of repeated abortion, and it is now a classical fact that all accoucheurs, both in France and abroad, with a few exceptions (happily rare), advise that, when successive abortions are observed in the same woman without apparent cause, she should be put on antisyphilitic treatment, and that, too, not only when no specific manifestation is present, but even when she has not shown any.

"When the pregnancy advances to term, (1) the child may be born healthy and in good condition, and remain so (this is exceptional); (2) It may be healthy when born, but may, during the first three months after birth, rarely later, show symptoms of syphilis (quite frequent); (3) It may show symptoms of syphilis from its birth, and may then either succumb quickly (the rule), or may be cured by appropriate treatment (the exception); (4) Although apparently healthy when born, it may die within a few days, either by reason of its feeble condition in consequence of premature delivery (often), or from convulsions (when delivered at term).

"2. *Syphilis and Conception are Concomitant.*—Here, too, abortion is the rule, or at least delivery is often premature, and in consequence of the rigid treatment to which the mother is

subjected, the child may, in exceptional cases, be born healthy (or without evident traces of syphilis), and then, as in the former instance, may either be cured or may succumb.

"3. *Syphilis is Contracted After the Fourth or Fifth Month of Pregnancy.*—In this case the danger is less. Abortion does not take place, but delivery is often premature, and when the fœtus reaches full term it may frequently be born healthy; or it may be apparently healthy when born, but may present syphilitic symptoms within two or three months after birth.

"4. *Finally, the Woman Contracts Syphilis Only at the Termination of Pregnancy.*—Then the danger is almost nil; pregnancy is concluded in the ordinary manner at term by the birth of a living, healthy child. It is during the secondary stage, that is, from the fourth month to the second year of this period, that maternal syphilis seems to predispose to abortion. But, as we know, syphilis may be active at the end of three, four, five, six years, or even longer. Those women are most prone to abort who are affected with severe forms of the disease—those who, to use Fournier's expression, are affected 'rudement et viscéralement;' but abortion may occur in all forms of the disease, even the lightest, and is often the sole expression of the diathesis. 'There are a certain number of women,' says Fournier, 'who abort exclusively because of syphilis, without, at the same time, presenting, or having presented, for a period more or less remote, any appreciable specific symptoms.' In his opinion, then, even latent syphilis is still capable of causing abortion. We share this conviction fully.

"We see, therefore, that syphilis is one of the diseases that deserves the greatest attention on the part of the accoucheur, and we realize the full importance of treatment in the interest of the mother as well as the child. Some writers have nevertheless insisted that these ravages should be attributed, not to the pox, but to its antidote, mercury. Such a view could not be too strongly opposed, and all obstetricians agree with the syphilographers in advising mercurial treatment during pregnancy, not only in the case of women who are actually affected by syphilis, or who show evidences of it, but in every instance in which the father has had syphilis, and where there have been repeated abortions without any known cause."

We are not quite sure that many of the aggravated symptoms sometimes seen in the subjects of syphilis under old-school treatment, do not owe the aggravation, at least in part,

to the character of the treatment which they have received. At any rate, such cases are not with us so numerous.

TREATMENT.—That which follows was prepared by T. S. Hoyne, M.D., at our request, especially for this work.

In the treatment of primary syphilis, *mercurius cor.* holds the first place, if mercury has not already been taken without benefit. A decided improvement should follow the administration of this drug within four or five days, especially if the ulcer is superficial, with free secretion of thick pus, or in case the ulcer is spreading and penetrating at the same time.

Mercurius jod. flav. follows well if the former preparation does not alter the ulcer for the better.

Cinnabar acts well in scrofulous patients.

Nitric acid always proves useful in persons who have taken considerable mercury without benefit. The special indications are, easily-bleeding chancres; superficial or elevated ulcer with zigzag edges, where no signs of central granulation are present.

Arsenicum is a very important remedy, and one not to be overlooked when the chancre becomes gangrenous or phagedenic; also for ulcers with proud flesh and bleeding edges; and for ulcers with a copious, thin, fœtid discharge.

In secondary syphilis the remedies which have proved beneficial may be grouped as follows:

Ars., phos., carbo veg., calc. carb., hepar sulph., silicea, sulphur and *kali carb.*—Falling out of the hair.

Calc. carb., iodium, petroleum, silicea, phosphorus and *sulphur.*—Cervical adenitis.

Nitric acid, thuja, arg. nit., calc. carb., lachesis and *arsenicum.*—Ulcers in the mouth and throat.

Nit. ac., arsenicum, calc. carb., mercurius, phosphorus, lycopodium and *sulphur.*—Erethema and roseola.

Arsenicum, nit. ac., aurum, ars. jod., coral, mercurius, hep. sulph., phosphorus and *phos. acid.*—Squamous and scaly diseases.

Hepar sulph., tellurium, silicea, sulphur, nit. ac., lachesis, ant. tart., graphites and *mercurius.*—Pustular diseases.

In the tertiary form of the disease *aurum* is indicated for the affections of the bones of the skull with a suicidal tendency.

Phos. acid.—Low-spiritedness, with intense pain in the periosteum of the bones.

Silicea and *kali jod.* in scrofulous persons, with ulcerations of the bones and fistulous opening.

Asafœtida.—Cramping, jerking and drawing in the bones at night: nodes very sensitive to the touch.

Fluoric acid.—Burning and intermittent pain in the bones.

Nitric acid for exostoses in patients who have taken large quantities of mercury.

Rhus tox.—Rheumatic pains aggravated on first moving after rest, and on getting up in the morning; paralysis of lower limbs.

Carbo veg.—Lung complications, with loose rattling cough.

Arsenicum.—Psoriasis palmaris and plantaris.

Benzoic acid.—Intestinal complications, with copious, watery, fœtid diarrhœa.

Staphisagria.—Caries of the teeth; ostitis and periostitis.

Goitre.—Primary development during pregnancy is quite rare; but increase of antecedent goitre, both in size and annoyance, is frequently noted.

Iodine is doubtless the best remedy for goitre, though other remedies have cured many cases. We regard the galvanic current of electricity as very effective.

Uterine Rheumatism.—We quote again from Charpentier: "Cazeaux and Gauthier have particularly called attention to this disease. Cazeaux considers it true rheumatism, but Gauthier regards it as identical with uterine neuralgia, which may also occur aside from pregnancy. Gestation produces modifications, however, in its course. Spiegelberg and Braun do not believe in uterine rheumatism and consider it as a result of either endometritis or metritis.

"*Symptoms.*—Among twenty-nine cases collected by Gauthier, eighteen commenced during pregnancy, before labor, and eleven began during parturition. The attack is never sudden. Before the appearance of uterine pain the patient complains of pains and contractions in the limbs and the trunk, of vertigo, palpitations and of syncope. Shortly afterwards, or at the same time, a continuous, dull pain, of variable intensity is felt in the sacrum, the hypogastrium and the lateral abdominal regions. This pain is exaggerated by movements of the mother or of the fœtus. At the end of a few hours or days, the pain becomes suddenly violent, sharp, lancinating, and lasts from a few seconds to several hours, beginning at the uterus, radiating into the lower limbs, and extending to the bladder and rectum. On applying the hand to the abdomen, we find that its walls are not the seat, and that the pain is uterine and not so limited as

in ordinary neuralgias. Almost always one of the surfaces or sides of the uterus is the chief seat of the pain. The pain is generally fixed, but may be mobile, the fundus uteri being usually less affected than other regions. The women experience a sensation of spasmodic constriction, due to uterine contraction, perceived by both patients and obstetrician during the earlier months. The uterus, in fact, grows hard. Sometimes it is smooth and sometimes nodular, from partial contractions. When the organ is large we can appreciate these changes in form, which may, in certain cases, produce an annular transverse constriction. The latter may be partial, and involve different parts of the uterus, including the cervix, and may occasion, according to the case, either rigidity, or rapid dilatation of the cervix.

"Gauthier admits two forms, one acute, febrile, and one chronic, apyretic form. The former may succeed the latter or may present momentary acute exacerbations. Uterine rheumatism occurs most frequently at term and during labor, at which time it may become the cause of dystocia. It may be developed after labor, either immediately or after a few hours. It then causes spasmodic uterine contractions, which lead to retention of the placenta. Finally, it may occur later yet, after fifteen days, as in a case of Neucourt.

"The usual complications are neuralgic or rheumatic pains in certain vescera, in the muscles or in different nerves, particularly the vesical and rectal nerves. Luroth has seen a case of rheumatic meningitis, and finally, there may be muscular pains in the face, the neck, the arm, the shoulder, the thoracic walls and the lower limbs.

"Very prone to relapse, this affection may recur several times, during or after pregnancy. The intervals vary from two or three days to several weeks. An individual attack varies from a quarter of an hour to twelve days, at the longest, but in general it does not exceed twenty-four or forty-eight hours. The disease may reappear in successive pregnancies. It may end in recovery, which is the rule; in a chronic condition, in metritis and in eclampsia.

"1. *Influence upon Pregnancy.*—When the attacks have lasted a certain time, and have been violent, they are followed by uterine contractions, and may thus provoke labor. But it is not always so, and Wigand quotes a case where the cervix dilated, and the bag of waters formed; when everything was

arrested, labor ceased, the os closed, the cervix regained its former length, and pregnancy went on its course. Sometimes the pains simulate labor without inducing it, and they may occasion faulty presentations.

"2. *Influence upon Labor.*—Uterine rheumatism impedes labor, and sometimes even renders the spontaneous expulsion of the fœtus impossible by interfering with the pains, by producing spasm of the cervix, and by preventing the woman from making voluntary expulsive movements.

"3. *Influence upon the Puerperal Functions.*—By causing tetanic uterine contractions it may produce dystocia, or may occasion hemorrhage by inducing uterine atony, which may be followed by metritis or by perimetritis.

"*Causes.*—These are difficult of detection. The disease may appear under all circumstances and at any stage of pregnancy. Gauthier saw it begin in twenty-nine cases, as follows:

In the second month,	1	In the first five months, 6 times.
" " third "	3	
" " fourth "	1	
" " fifth "	1	
" " sixth "	2	In the last four months (twelve occurring in the last month), 23 times.
" " seventh "	4	
" " eighth "	5	
" " ninth "	12	

"Meissner regards rheumatism as a neurosis of uterine sensibility and motility, caused by peripheral irritation, and particularly by cold.

"The predisposition increases as the full term approaches, and is notably augmented near the time of labor.

"*Prognosis.*—Although not fatal to the woman, uterine rheumatism is still serious because it may occasion abortion or premature labor, or by retarding and complicating labor it makes the condition of both mother and child much less favorable. It is particularly disagreeable when developed at the end of pregnancy, because of its tendency to recur several times before confinement, even when it does not interrupt pregnancy. In these cases it almost always recurs during parturition, which it renders long and difficult."

Treatment.—The homeopathic medication of rheumatism

is not as satisfactory as we might wish, and yet by means of it we are frequently enabled to make some brilliant cures.

Caulophyllum.—This we regard as one of the very best remedies for the treatment of rheumatic conditions during pregnancy, and it is probable that, on account of its virtues in this direction, it has acquired a reputation for producing painless labor. Many of the false labor-pains which precede the true, and cause so much annoyance, are due to a rheumatic condition of the uterus, and caulophyllum, when systematically administered for a few weeks prior to labor, removes this, and leaves nothing but the labor-pains pure and simple to be suffered. Its control over after-pains, in certain cases, is probably due to a similar action. It is a remedy which we always use in the fluid extract.

Arnica is often serviceable, especially when the muscles feel lame and sore as if they had been bruised.

Bryonia is indicated by its usual characteristics of aggravation on motion, sharp, tearing, drawing pains, usually worse in the morning and from touch.

Rhus tox.—Soreness and stiffness of affected parts; worse during rest; during cold, damp weather, and at night.

These are the leading remedies, but other valuable ones are: *cimicifuga, colchicum, mercurius, pulsatilla, ranunculus, rhododendron* and *sulphur.*

Women suffering from uterine rheumatism ought to be placed under the influence of an anesthetic as early in labor as their safety will justify, and the delivery hastened as rapidly as the conditions will allow.

Insanity of Pregnancy.—During the latter part of 1888, and the early part of 1889, Dr. H. H. Crippen published an article in sections, in *The Homeopathic Journal of Obstetrics,* under the above caption, so complete in detail, and so excellent in character generally, that for this entire account of the Insanity of Pregnancy, I have drawn almost wholly from the article named.

"More than two years ago," says Dr. Crippen, "in writing on this subject, I stated that, 'in selecting the title Insanity of Pregnancy for this paper, I have been guided by two reasons: first, that I might include all conditions pertaining to the mental aberrations arising from any of the exaggerated physiological influences affecting the child-bearing woman; and

second, that the term puerperal mania, usually made to include all these conditions, is a misleading one, as many cases belong to the class of melancholia as to mania.' To-day I find myself supported in this view by Charpentier, who includes in the diseases of pregnancy, the insanity of pregnant women, insanity developed during labor, during the puerperium, and during lactation, and further says: 'True puerperal mania, we admit, will manifest itself three or four weeks after labor, but it seems impossible for us to separate it entirely from the insanity of the pregnant or of nursing women. We therefore include these forms in our study.' From conception to the end of lactation we have a period marked by a series of physiological crises, and insanity, therefore, whether associated with the pregnant state, with parturition, or with lactation, is merely consequent upon a sequence of events that arise from pregnancy directly, or have that condition as their antecedent."

Before discussing symptoms, we will rapidly review the statistics.

"1. *The Proportion of Insane Patients Occurring Among Pregnant, Parturient, or Nursing Women.*—The statistics are not only hard to obtain, but are also very untrustworthy, chiefly on account of nomenclature." Crippen then gives the following table:

Charpentier's statistics	Among	6,700	found	41 cases.
Columbia Hospital	"	1,149	"	3 "
Freedmen's Hospital	"	680	"	0 "
		8,529		44

That is .529 per cent., or 5.29 cases out of every thousand. Even allowing that this is a higher estimate than the percentage of cases occurring in private practice, there is still a great discrepancy between this and Fernald's statement that, at the lowest estimate, at least one out of every thousand lying-in women becomes insane.

"2. *The Extent to which Insanity is Due to Causes Relating to Pregnancy.*—During the winter I spent at the Bethlehem Royal Hospital, I found that out of 561 female patients, there were 58 cases, or 10.3 per cent." According to other statistics which follow, the percentage is raised to 7.83.

3. Relative frequency of the cases during pregnancy, during the puerperium, and during lactation:

	Number of cases.	Pregnancy.	Puerperium.	Lactation.
Palmer	19	2	6	12
Esquirol	92	0	54	38
Hanwell (Connolly)	43	4	26	13
Macdonald	66	4	44	18
Marcé	310	27	180	103
Tuke	155	28	73	54
Leidesdorff	20	6	14	0
Crippen	58	7	47	4
Total	763	78	444	242

"1. *Insanity During the Period of Pregnancy.*—Besides the physical disturbances caused by changes taking place in the constantly increasing bulk of the uterus, we are all familiar with the various modifications in the tastes, habits, and temperament of a pregnant woman. To what degree such changes belong to the 'borderland of insanity' (so happily treated of by Maudsley), it is difficult to say. A slight derangement of the physical processes may produce eccentric longings, affect the emotions, the intellect, or the will, or change the habit of life, so that those who were energetic may become indolent and lazy, while others may become irritable, with a tendency to the perpetration of unusual acts. Besides the perverted longings and hysterical affections, the unstable conditions may amount to moral perversions, such as dypsomania or kleptomania, which in some cases may be gradually developed, and in others suddenly and irresistibly implanted. The proportion of cases of insanity occurring during pregnancy has already been shown to be comparatively small, being not nearly as common as those at or following childbirth. In my list of 58 cases, the seven that occurred during the period were all found to have their origin during the latter months. In the earlier months excessive vomiting produces great exhaustion, and to this physical weakness, combined with a neurotic tendency, or to the latter alone, may be due those extraordinary longings and nervous symptoms, that, passing beyond the limits usually met with, become insanity. This may pass off to reappear after delivery, or may continue in an unbroken course through pregnancy to parturition, or beyond it, but the majority of cases ultimately recover.

"2. *The Period Beginning with Labor and Ending with the*

Lochial Discharge.—Physiologically the pains of labor may often start considerable mental disturbance, and from this instability it is that cases of this period are more numerous than those of the two other periods combined. In my experience, nearly seventy per cent. of the cases of insanity of pregnancy appear during this time. This is the period in which the term puerperal insanity may be applied to the mental unsoundness. With this group I have included miscarriage, of which I have the histories of seven cases. They differ but little from those of labor at full term, except, perhaps, in the particular that complications exist, such as severe flooding, or that there might have been a shock as a causation of the premature delivery and likewise of the weak-mindedness.

"The type of insanity varies much. In my own experience melancholia and acute mania predominate, the former slightly in excess."

"Those cases of emotional, morbid, objective impulses, marked by homicidal and suicidal propensities, are of more interest in a medico-legal point of view. They are usually associated with aversion to the children or to the husband, or, on the other hand, the impulse to destroy life may be the result of a delusion. That such cases are common are recognized by all. An analysis of my list of cases shows that sixteen were suicidal, nine homicidal. The refusal of food is a serious consideration, and cases are constantly coming to the hospital in an exhausted condition from the lack of sufficient means of forced feeding at home.

"Some cases are apathetic from the beginning; take no notice of husband or child; have a dull vacant look; are dirty in their habits and tend to lapse into indifference to their surroundings; so that, unless we succeed in arousing their torpid mind, they pass into a condition of dementia.

"As to temperature, Dr. Campbell Clark, of Edinburgh, draws attention to four types of temperature curves observed among twenty cases: (a) 'A moderate and uniform increase in uncomplicated cases.' (b) 'A periodicity of increase and decrease.' (c) 'A uniformly high evening temperature with well morning remission in phthisical cases.' (d) 'A persistent high temperature pursuing an erratic course.' His comment on these differences in temperature curves is worthy of note. A significant addendum to the above statement is that cases of the (c) and (d) types died.

"3. *Insanity Due to Lactation.*—This condition is usually associated with exhaustion after prolonged nursing, or it may appear in a weakly woman unable to stand this extra tax upon her strength after having passed through the puerperal state. So that the term over-lactation is relative, depending purely upon the accompanying conditions.

"In these conditions the physical exhaustion leads to mental depression. To the exhaustion are due the anæmic appearance, the shortness of breath and the sleeplessness; while the uneasy feelings the patient experiences lead to delusions and hallucinations of sight, hearing or smell. Naturally enough the depressed state of the mind tends to delusions of unworthiness, so that the usual condition is that of melancholia.

"ETIOLOGY.—Primarily we may look upon the mental aberration as dependent upon an overthrow of that unstable condition of mind which arises from causes associated with or following pregnancy, but there are many important secondary considerations to be referred to in this relation, since the disease presents, in so many cases, a double, a triple, or even multiple combination of causes. We may look upon the causes as predisposing and exciting, or again as moral, social, and physical; but rather than confuse by attempting any dividing line, it is preferable to consider each one separately.

"*Heredity.*—The influence of heredity in predisposing to insanity is becoming well recognized. In consequence of a sameness of conditions of long duration in the past, tissues may receive modifications that produce a proneness to suffer in a particular manner when exposed to ordinary exciting causes. In the instances which we are considering, the nervous system has been especially influenced in the particular direction to be pointed out under the discussion of pathology.

"In my experience, twenty-three out of fifty-eight cases had a family history of insanity; in eight cases the mother had suffered from insanity, and in one case there was the remarkable history of daughter, mother and grandmother, all having puerperal mania. In seven cases phthisis existed in the family, and in three there was a history of cancer.

"Closely associated with heredity, as a predisposing cause, is the history of previous neuroses in the patient. In the histories of thirty-six out of fifty-eight cases, there existed previous nervous disorders varying from convulsion to derangements of the mind. These cases include fourteen having previous

attacks of insanity during pregnancy, during the puerperium or during lactation, of which eleven were second and three third attacks.

"*Number of Pregnancies.*—Most authorities affirm that primiparæ are most subject to the disease. In my own experience the proportion of primiparæ to multiparæ was twenty-six to thirty-two. The special point to be emphasized is that cases having children rapidly are liable to suffer from exhaustion.

"*Age.*—The following table will show at a glance the proportion occurring at different ages:

Observer.	Number of cases reported.	From 15 to 20 years of age.	From 20 to 25 years of age.	From 25 to 30 years of age.	From 30 to 35 years of age.	From 35 to 40 years of age.	Over 40 years of age.
Clouston...	60	3	16	29	9	12	0
Marcé	55	1	13	17	13	5	6
Savage	207	0	49	67	44	29	18
Crippen....	58	1	16	17	12	9	3
	380	5	94	111	78	55	27

"From this table it would appear that those in the earlier periods suffer most from this condition, but, since at this time fecundity is greater and the proportion of births greater, I believe that the tendency to insanity increases with age; for, with increasing age, we find women less able to bear the trials, worry and exhaustion of pregnancy, parturition and lactation.

"*Qualitative Changes in the Blood.*—A perverted condition of the blood quickly exercises a marked effect upon the function of the cerebral cells, and while I believe that the quantitative change in the blood-supply to the brain is most often the pathological condition, yet there certainly are cases of insanity of the variety under discussion that are due to a physical deterioration of the blood. Thus, in consequence of defective nutrition in the exhaustion produced by lactation, or by ill conditions of existence—as overcrowding, bad air, insufficiency of food, intemperance—we may find both predisposing and exciting causes."

Dr. Crippen mentions Sir J. Y. Simpson's claim that albuminuria is a prominent factor in the production of insanity of the sort under consideration, and adds that "though this extreme view of Sir J. Y. Simpson has not met with general acceptance, it must not be put aside, and I have intentionally dwelt upon it with the idea of emphasizing the fact that

frequent analyses should be made of the urine of pregnant women."

"There still remains for discussion a multitude of minor causes both predisposing and exciting. Miscarriage, that may or may not be followed by hemorrhage and exhaustion, is the cause of a considerable number of cases. Exhaustion may be dependent on excessive vomiting in the early months of pregnancy, upon prolonged labor, upon severe hemorrhage at parturition, or may be dependent on over-lactation. The use of chloroform has been blamed as an exciting cause, but I have no history of such a case. It is also possible that forceps have a share in the causation, but as such there are very few cases on record.

"The French claim that mothers of illegitimate children are very liable to puerperal insanity.

"Pregnancy especially, of all these periods, renders women more sensitive, nervous, erethistic, and excitable. At such a time an unkind word or look, indifference, or even thoughtless neglect on the part of the husband, weighs with a heavy burden upon an already unstable mind. In the case of melancholia, the weight of sorrow presses energy and will out of place, and the whole intellectual life revolves around one painful fixed spot. Anxiety, with the dread and peril of labor, may produce a self-consciousness, passing into a morbid state. So varied are the causes that one hardly knows where to draw the line, and to add to the difficulty, it is rare to find causes acting singly; more often they are multiple.

"DIAGNOSIS.—It is unnecessary to speak of the diagnosis of the insanity of pregnancy or of childbed, except that it is essential to differentiate acute puerperal mania from the so-called puerperal phrenitis and from the delirium of puerperal fever.

"We distinguish puerperal meningitis as a distinct disorder, that may be differentiated from acute mania by the contracted pupils, the intense headache, the high temperature, and the rapid progress of the disease towards collapse. On the contrary, in acute puerperal mania, the pupils are usually dilated, the headache is not a prominent symptom, and the temperature seldom reaches a high degree except when complications are present. The premonitory symptoms of acute mania are also distinctive, and have existed for a longer time preceding the marked onset of the disease. Some singular change of manner

or mode of thought, or querulousness with incoherent talking, commonly appears before the violence of the attack.

"Prognosis.—It appears to me that before so much attention was paid to puerperal fever and to puerperal septicæmia, many cases of puerperal mania must have had these conditions as complications. Certain it is that the death-rate was greater than it is at the present day. Under Esquirol, in La Salpetrière, out of ninety-two cases, six died, or one in fifteen. Of Dr. Burrows' fifty-seven cases, ten died, or one in six. Of Leidesdorff's twenty cases, one died. Webster saw five deaths in one hundred and eleven cases. Among fifty-eight cases in my own experience, one died.

"Besides prognosis as to life, we have the question of recovery of the mental faculties. Generally it is believed that the termination is favorable, and this is borne out by statistics. Dr. Webster states as the result of his observation that 'three in every five cases of puerperal insanity may be confidently expected to recover within a year.' Two-thirds of Esquirol's cases were cured within the first six months after the commencement of the attack. Of Dr. Palmer's nineteen cases, fourteen had recovered after four months' treatment, and two were convalescent. Of the thirty-five cases recovering under Dr. Burrows' observation, nine recovered in the first month, five recovered in the second month, five in the third, three in the fourth, two in the fifth, four in the sixth, one in the seventh, two in the eighth, one in the ninth, one in the fourteenth, and one in the twenty-fourth month. Dr. Burrows continuing, says that one recovered after three years, two after four years, one after six years, and one after seven years, and that he never met with one permanently fatuous from insanity.

"In making up one's prognosis it is well to bear in mind the brief aphorism of Gooch, which still holds good after more than half a century has elapsed. Briefly stated this is, that acute mania is a less durable disease than melancholia; it is more dangerous to life, but less dangerous to reason.

"It remains but to say that insanity may follow upon puerperal fever as after any other acute exhausting disease, and that the termination depends much upon the condition of debility. Suicidal tendency, too, is dangerous to life, more especially where morbid impulses exist, than where there are delusions prompting the patient to destroy her life. To some, then, the prognosis with regard to life depends on complications, and if death occurs it is more often from secondary causes.

"In all forms of insanity there exists a tendency to future attacks after recovery, and we have this well marked in the conditions under consideration. This tendency must be given due weight in prognosis, and especially must it receive careful thought if there is a family history of neuropathics. But a previous attack does not necessarily imply that the next pregnancy will be followed by an upset of the mental balance; cases are cited in which the first attack was before marriage and the next not until after the eighth child, and again, where patients have suffered after the first and third, third and fifth, or fourth and sixth pregnancy."

TREATMENT.—Passing by general considerations with respect to the question of removal to an asylum, the sanitary surroundings, the quality and quantity of food, as well as the methods of administration, we shall here give only the medicinal treatment, which is set forth by Dr. Crippen in a most perspicuous manner.

"*Aconitum*.—Melancholia following excitation produced by fear. The morbid state of the mind approaches dementia in lack of courage, confidence, and energy of character. Moans and lamentations arising from the apprehension that her death is near. She becomes positive of the date of her death. Weakness of memory; loses the faculty of remembering dates. Expression of terror and imbecility in the countenance.

"In mania accompanied with febrile condition. Fitful mood; at times in furious delirium, again in full possession of the mental faculties. Delirium, especially at night.

"*Actæa racemosa*.—Melancholia following labor. A heavy cloud of misery hangs over the patient. Dr. E. M. Hale places great stress on the symptom of sleeplessness as a key-note, and gives also as characteristic symptoms: 'She was suspicious of everything and everybody; would not take medicine if she knew it; indifferent, taciturn; takes no interest in household matters; frequently sighs and ejaculates; great apprehensiveness and sleeplessness.

"*Aurum*.—Suicidal mania with dejected spirits. Religious mania; she howls and screams and imagines she is irretrievably lost because she has neglected some duty. Aurum is seldom indicated in the melancholia of females. Platina will more often be found suitable in such conditions, arising from disturbances of the sexual organs of the female.

"*Belladonna*.—The wonderful effect of this drug over dis-

eases of women extends equally to the mental symptoms arising from disturbances of the female genitalia. In its pathogenesis we find: foolish manner; immoderate laughter; she sings merry but senseless songs; mania; she spits at those around her; bites, strikes and tries to escape and hide herself; delirium, which returns in paroxysms, first of a merry nature, afterwards changing to rage.

"*Bromide of Potassium.*—Dr. E. M. Hale gives the following: 'Puerperal mania, when attended by ferocious or erotic delirium. He advises its use in minute doses 3^{x} to 6^{x}, in mental depression from cerebral anæmia or exhaustion. The pathogenesis of kali bromatum is suggestive of dementia.

"*Chamomilla.*—Mental erethism. Angry and out of humor; cannot bear to be spoken to or interrupted. Slight irritations of the mind produce great anguish and distress. Inclined to be quarrelsome; she seeks a cause for quarrelling. Irritability, even amounting to incivility.

"*China.*—Mania following hemorrhage or after prolonged lactation. Excessive sensitiveness of the whole nervous system, debility, exhaustion, intolerance of noise; extreme anxiety and apprehensiveness. The patient sees persons and objects on closing the eyes; these disappear as soon as the eyes are opened (*calc. ost., bell.*).

"*Cuprum aceticum.*—Cuprum metallicum appears to have been a reliable remedy in mania in Dr. Jahr's experience, but I place greater confidence in the acetate, in the following condition: Mania appearing in paroxysms; confused look; at times she is in apparent full possession of her mental faculties, yet is liable to paroxysms of howling, which come suddenly and unexpectedly.

"*Hyoscyamus niger.*—This remedy seems especially adapted to acute mania in which there is excitation without any evidence of inflammation. The symptoms as given by Farrington will apply equally well for our purpose. 'The patient under such circumstances has many flexible notions, all arising from these morbid impulses. He imagines, for instance, that he is about to be poisoned. Possibly he will refuse your medicine, declaring in angry tones that it will poison him. Or he imagines that he is pursued by some demon, or that somebody is trying to take his life. This makes him exceedingly restless. He springs out of bed to get away from his imagined foe. The senses, too, are disturbed. Objects look too large, or else are of a blood-red color. Sometimes objects appear as if they were

too distinct; that is, they have an unnatural sharpness of outline. The patient talks of subjects connected with everyday life, jumping from one subject to another pretty much as in lachesis; all this time the face is not remarkably red, possibly it is only slightly flushed. The pupils are easily dilated; sleep is greatly disturbed; the patient lies awake for hours.

" 'At other times we find the delirium returning anew and the symptoms take another form. The patients are silly and laugh in a flippant manner. Sometimes, for hours at a time, they will have a silly, idiotic expression on the face. Again, they become lascivious, throw the covers off and attempt to uncover the genitals. The abnormal movements accompanying these symptoms are rather angular; they are not at all of the gyratory character of stramonium.'

"*Ignatia.*—Melancholia; despairs of her salvation; imagines she has been faithless to her husband; weeping bitterly; tenseness of the abdomen; cold hands and feet; desires to be alone with her grief.

"*Lilium tigrinum.*—In comparison with sepia Dr. S. H. Talcott gives the following indications: 'Lilium and sepia find an important place in the treatment of depressed and irritable women. The troubles in such cases originate largely in the malperformance of duty on the part of the generative organs. Both *lilium* and *sepia* cases are full of apprehensions and manifest much anxiety for their own welfare. In the *sepia* cases, however, there are likely to be found more striking and serious organic changes of the uterine organs; while the *lilium* case presents either functional disturbance or a very recent and comparatively superficial organic lesion. *Lilium* is more applicable to acute cases of melancholia where the uterus or ovaries are involved in moderate or subacute inflammation, and where the patient apprehends the presence of a fatal disease which does not in reality exist. The *lilium* patient is sensitive, hyperesthetical, tending often to hysteria. She quite readily and speedily recovers, much to her own surprise, as well as that of her friends, who have been made to feel by the patient that her case was hopeless. The *sepia* patient is sad, despairing, sometimes suicidal, and greatly averse to work or exercise. There is, however, often a good reason for the patient's depression, for, too frequently, she is the victim of profound organic lesions which can, at best, be cured only by long, patient, and persevering endeavor.'

"*Opium.*—Furious mania, with distortion of the features, bloating and redness of the face, bluish redness and swelling of the lips. Exalted imagination; frightful visions of ghosts, demons and horrid beasts.

"*Platina.*—Very proud and haughty. Excitation of the sexual passions, with voluptuous crawlings and tinglings in the genitals, nymphomania. Melancholia; thinks she is not fit for the world, is tired of life, but has a dread of death. The feeling of great personal superiority is the manifest characteristic of this remedy. Persons are looked down upon as inferior and insignificant. She is out of sorts with the world, for everything seems too narrow. Objects about her look to be smaller than natural.

"*Pulsatilla.*—Depression of spirits; sad, weeping mood; solicitude about her salvation; disposition to suicide, but fear of death; chilliness, flashes of heat, cold hands and pale face.

"While the lachrymose symptoms of this remedy are, in the main, characteristic, the drug must be compared with others that have the weeping mood. Among these we have *ignatia, natrum mur., stannum* and *sepia.* For the purpose of comparison we may study Farrington with advantage.

"The *ignatia* woman dwells upon her grief in secret; she nurses her sorrows and keeps them to herself. In the words of Shakspeare, she lets 'Concealment, like a worm i' the bud, feed on her damask cheek.' This introspective mood is the opposite of *pulsatilla.* The *pulsatilla* patient makes known her grief to everyone who comes near her; she seeks sympathy; she is timid and yielding in her disposition.

"This tender, yielding disposition, that likes consolation, differs from *natrum mur.,* in which, with hypochondriasis, consolation seems to make the patient worse. Attempts at consolation may even make her angry.

"The *stannum* patient is usually sad and lachrymose, just like *pulsatilla.* Crying usually makes the patient worse. The woman for whom *stannum* is indicated is also nervous and weak. *Stannum* will come in as a prominent remedy in lung troubles complicating insanity of pregnancy.

"*Sepia* also develops a state of weeping; anxiety with ebullitions; peevish ill-humor; solicitude about her health. But with all her lachrymose temper, she is easily offended and is inclined to be vehement.

"*Stramonium.*—The mania of this drug may be of a wild or

of a merry character. Delirium with bright, red face; the eyes have a wild and suffused look. Terrifying hallucinations; the patient sees animals springing up from every corner. Loquacious delirium; at times a merry mood; at others she has the horrors. Laughing, singing, and making faces one minute; the next, praying or crying for help. Desire for company and for light, with fear of the darkness.

"In comparing *stramonium*, *hyoscyamus* and *belladonna*, Farrington says: '*Stramonium* differs from *belladonna* and *hyoscyamus*. The patient sees objects which seem to rise in every corner of the room and move towards him. He has a mania for light and company, which is just the opposite of *belladonna*, is excessively loquacious and laughs, sings, swears and prays, almost in the same breath. The desire to escape is present; there is sudden spasmodic lifting of the head from the pillow, and then dropping it again. He awakens from sleep in fright and terror, not knowing those around him. The motions that he makes are quite graceful and easy, although they may be violent. At times the body is bathed in a hot sweat, which does not give any relief to the patient. The desire to uncover is similar to that of *hyoscyamus*, but it is more an uncovering of the whole body than of the sexual organs. The tongue is often soft, taking the imprint of the teeth. Screaming in sleep, often with hiccough. The face is usually bright red, but not so deeply congested as in belladonna.'

"*Sulphur.*—Despondency. Religious melancholia, with despair for her salvation; irritable and taciturn; slowness of body and mind during the day; indisposition to do any labor. Mania; she spoils her things and throws them away, imagining she has everything in abundance. She imagines she has beautiful dresses; looks on old rags as beautiful dresses.

"*Veratrum album.*—Furious mania. Wild shrieks, protrusion of the eyes; bluish and bloated face; anxiety; frightened at imaginary objects; lasciviousness; lewdness in talk; endeavors to kiss everyone. Coldness of the surface of the body, with cold sweat on the forehead.

"*Veratrum viride.*—Mania with arterial excitement. Eyes red; pulse small but very frequent. This drug has been used in a case of acute mania with curative effect after hyoscyamus, stramonium, veratrum album and hepar sulphur had been used in vain. The symptoms were: loquacity with exaltation of ideas, or an exalted opinion of her own powers; every-

thing seems clear to her; what had formerly been mysterious to her, she now clearly understands; she does not want any medicine that will restore her to her former condition; some of the time she talks and laughs; on some days the laughter is quite constant; one day she talks a long time about one thing, and again changes that theme to another; will persist in continual talk, without heeding what is said to her; will not answer questions; does not like to be disturbed when she is talking; she knows all that is going on about the house, and does not want anything said which she cannot hear; does not want to get up long enough to have the clothes changed; head feels bad; the eyes are red, but vision is not affected; appetite capricious; not much thirst; pulse small and frequent. The remedy was used in tincture.

"In one of Dr. Atlee's cases the patient was stubbornly silent, suspicious, and distrustful of those about her. She thought the physician had poisoned her, meditating her destruction.

Eclampsia.—All convulsive attacks during pregnancy, parturition and puerperality, are not properly classified under this heading, since some of them are manifestations of epilepsy, before present, and others incidental symptoms associated with other diseases. The true puerperal convulsion is an expression of pathological conditions in which the changes incident to pregnancy constitute essential factors.

Puerperal eclampsia is an acute disease occurring in women in pregnancy, in labor, or in childbed, often sudden in its onset, rapid in its progress, characterized by convulsions, with loss of sensation and consciousness, ending in coma. (Bailly.) The term eclampsia, signifying flashes of light, indicates the overwhelming force of the attack, and the lightning suddenness with which it often sets in.

Frequency.—The average frequency of eclampsia is about one case in three hundred. According to the statistics gathered by Dr. George B. Peck, among twenty physicians of our school of practice, representing a total experience of three hundred and five years, fifty-one cases had been met. It is more frequently met among primiparæ, especially in those well advanced in years, in twin pregnancy, in women with contracted pelves, and in connection with the birth of male children. It is sometimes epidemic.

Etiology.—The following theories respecting the conditions

which excite eclampsia in pregnancy and childbed have each had strong advocates, and each now has its supporters:

1st. Material change in the nervous centers and their envelopes.

2nd. Cerebro-spinal congestion.

3rd. Reflex irritation through the spinal system, of which the point of departure is the uterus.

4th. General or cerebral anæmia.

5th. Blood-poisoning, which disturbs the normal action of the nerve-centers.

1. *Eclampsia is Due to Material Changes in the Nervous Centers and their Envelopes.*

From experiments which have been made, it is clearly shown that the augmentation of blood-pressure alone is not sufficient to bring on the convulsions; but the serous effusions which result—in other words, the cerebral and spinal œdema—have been regarded by many as adequate exciting causes.

2. *Eclampsia is Due to Cerebro-Spinal Congestion.*

This theory was held by the older obstetricians, among whom is Dr. Hodge, who says that "convulsions in a large proportion of cases arise from a congestion of the blood-vessels of the brain, or from an actual effusion of serum or blood into its substance or cavities." It has been shown by more recent observers that the evidence of cerebro-spinal congestion and hemorrhage found in certain autopsies of women who died from eclampsia, is the result of the convulsions, and not the cause of them.

3. *Eclampsia is a Nervous Disturbance Set Up by Reflex Irritation of the Spinal System, the Point of Departure being the Uterus.*

This theory has had many advocates of acknowledged standing and repute, among whom are Dubois, Scanzoni, Marshall Had and Tyler Smith. "In conclusion," says Tyler Smith, "to give a summary of the whole subject, the true puerperal convulsion can only occur when the central organ of this system, the spinal marrow, has been acted upon by an excited condition of an important class of incident nerves, namely, those passing from the uterine organs to the spinal center, such excitement depending on pregnancy, labor, or the puerperal state. While the spinal marrow remains under the influence of either of these stimuli, convulsions may arise from two series of causes—those acting primarily on the spinal

marrow, or centric causes; and, secondly, those affecting the extremities of its incident nerves—causes of central or peripheral origin." When we reflect upon the remarkable uterine changes which are wrought by pregnancy, and the phenomena of parturition, this theory certainly assumes significance and importance. "The answers to this theory are," remarks Parvin, "first, eclampsia may occur either before or after labor when the uterus is in complete repose, not the slightest manifestation of an irritated condition; and, second, the uterine irritation being so much greater in primigravidæ, they ought to be much more generally the subjects of eclampsia. It is now generally held that while uterine irritation may, in some cases, assist in causing a convulsive attack, it is not the chief cause of the disease; or even if in a very few cases it may be the chief or only cause that can be discovered, it is inadequate to explain the majority of cases."

4. *General and Cerebral Anæmia are the Causes of Eclampsia.* Some writers on the subject have regarded general anæmia, and others cerebral anæmia, as the pathological condition upon which eclampsia is based. These authorities attribute the general anæmia in the main to the albuminuria which they assume to exist in all, or nearly all, cases. But our own observations, as well as those of many eminent obstetricians, prove that albuminuria is by no means an essential antecedent of eclampsia. Charpentier has tabulated 141 cases reported by forty-five different observers, wherein there was no evidence of albuminuria prior to the development of the convulsive seizure. And since in a large percentage of cases no examination of the urine is made until after attention is drawn to it by the occurrence of convulsions, the question has well been raised whether the albuminuria is the cause, or the sequence of the convulsions.

The cerebral anæmia, which by some is regarded as an efficient cause of the seizures, is accounted for, in a measure, by irritation of the nerve-centers from circulation through them of vitiated blood, thereby giving rise to vaso-motor disturbance, resulting in contraction of the cerebral arteries.

5. *Eclampsia is Due to Blood-poisoning, which Renders the Vital Fluid Inefficient to Sustain Normal Action of the Nerve-Centers.*

Under this head are included mainly uræmia and ammoniæmia. It is the most commonly accepted theory, though not one upon which we can explain all cases.

We cannot give our exclusive endorsement to any one of these theories, inasmuch as we believe that there is no uniform pathology back of the phenomena. Indeed, it seems to us probable that each of these theories is capable of accounting for a certain number of cases.

Pathological Anatomy.—The lesions which are met at the autopsies of women dead from eclampsia are so numerous and various that we may seriously question whether the disease has any distinctive pathological anatomy. Sometimes they are in the brain, at others in the lungs, and again in the kidneys; hence it is impossible among these to find one lesion which may be regarded as characteristic. Such able observers as Ramsbotham, Velpeau, Scanzoni, Cazeaux, Kiwisch and Jacquemire, have made a certain number of autopsies in such cases without discovering any lesions. Braün in one case found intermeningeal apoplexy; in ten cases anæmia and œdema of the brain and its envelopes. In forty-two autopsies made by Devilliers, Regnauld, Lever, Hardy, Collins, McClintock, Ramsbotham, Kiwisch and others, there were ten cases of hyperæmia, four of anæmia, four of normal vascularity of the brain, seven of serous effusions in the arachnoid, five of ventricular hydropsies, and twelve of apoplectiform extravasations of the brain.

De Paul, Blot, Bailey, Mercier and Charpentier have noted cerebral hemorrhages, and Molas arachnoidal hemorrhages. Helm, Kiwisch and Braün have observed hyperæmia of the membranes, and meningeal apoplexy. Bloff noticed serous effusions in the spinal cavity.

The alterations most frequently observed are in the kidneys. These, however, are not constant, though in many cases they may be overlooked for want of thoroughness in the examination, or inadequacy of the means employed. The morbid changes observed are mainly (1) hyperæmia and slight exudation; (2) exudation and a certain amount of fatty degeneration; (3) atrophy.

Dr. Alexander Pilliet lays great stress upon the hæmorrhagic foci which are found in the livers of women after death from puerperal eclampsia. He infers that the hepatic lesion is primary, and that this pathological discovery must modify our opinions and our treatment of one of the gravest complications of childbed. Twelve necropsies have been made by this obstetrician, and in all the characteristic changes in the livers were detected. This series does not include any case of cholemic

eclampsia or hepatic anæmia of pregnancy and the puerperium; and in the twelve, icterus, where it occurred, was slight, and appeared after the other distinct symptoms. The hæmorrhagic foci in the tissues of the liver are no mere product of simple engorgement of a vessel followed by rupture. There are associated with complicated local pathological changes, minutely described by Dr. Pilliet. In certain respects these foci resemble similar appearances observed in the kidney in scarlatinal and erysipelatous nephritis. The most careful search, however, has failed to detect any bacteria in the foci in Dr. Pilliet's twelve cases. He maintains that since a distinct and severe lesion of the liver was found in every one of the twelve cases of death from puerperal convulsions, it is reasonable to suppose that the lesion is pathognomonic of the complication in question.

Effect on Pregnancy.—This is nearly always decided. The morbid conditions existing in the mother and which lead up to the development of convulsions, together with the immediate effect of the strong convulsive action, nearly always prove destructive to fœtal life. Labor may not immediately ensue, but is not long delayed. The duration of labor is somewhat shortened by strong uterine action and the relaxation which follows the convulsive movements.

Prodromata.—An attack of puerperal convulsions is nearly always preceded by premonitory symptoms, the significance of which should be understood. They are not equally valuable as indices of the morbid state of the system. The patient suffers from sleeplessness, or an inclination to the opposite condition of drowsiness; there may be vertigo, vomiting, ringing in the ears, irritability of temper and lowness of spirits. None of these, however, are peculiarly indicative of threatened convulsions; but when to them are added severe frontal headache, disturbance of vision and epigastric pain, we have the premonitory symptoms well mapped out before us.

The headache involves chiefly the sinciput, pain rarely being felt in the occiput. It at first is felt at intervals, after a time the intermissions become mere remissions, and when the ache becomes constant the eclamptic seizure is usually at hand. The headache may precede convulsions several days, or only a few hours, but is nearly always present for a time before the first paroxysm.

Disturbances of vision are nearly as constant a forerunner

of eclampsia. These are dimness of sight, as though a mist were before the eyes, amblyopia, hemiopia and diplopia. Blurred vision is the most common, and occasions the patient great annoyance in the performance of her daily household duties. On attempting to read, the letters run together or appear to be obscured by film before the eyes; on trying to sew, she can scarcely see the stitches. These ocular disturbances increase in severity as the patient nears the eclamptic seizure, total blindness sometimes developing, and continuing for days. Severe pain in the region of the solar plexus is occasionally experienced for a few hours before the convulsive attack. In a case which came under our care a few years ago, this epigastric pain came on severely about two o'clock in the afternoon, in a patient seven months advanced in pregnancy, and refused to yield to remedies aided by various adjuvants, culminating about two hours later in the beginning of a series of convulsive seizures which terminated in death. The pain in this instance was evidently as severe as that attending an aggravated attack of bilious colic.

THE SEIZURE.—This commonly sets in suddenly and violently. The patient, totally unaware of the terrible experience before her, may be engaged about her ordinary avocations, when she suddenly falls to the floor with the muscles set in a tonic spasm. The head is usually turned to one side, and the eyes appear to be set as though gazing at a fixed object. The extremities are extended, the hands firmly closed with the thumbs under the fingers. The face becomes livid, and the pulse feeble and rapid. Consciousness and sensibility are wholly lost, and the pupils do not respond to light. The mouth is distorted and usually deviates to the left. The convulsive wave extends from above downwards, and involves all the voluntary muscles. Whether the muscles of organic life are implicated or not is a matter of speculation, but from observations made by Braxton Hicks it would appear that the uterus sometimes shares in the convulsive action. The tonic stage is soon succeeded by the clonic, wherein the body, by the irregular action of its various muscles, is thrown and jerked about in a most distressing manner. The lividity of the countenance becomes more marked, on account of the impeded respiration; breathing is carried on in an irregular and imperfect manner, and through the set jaws frothy saliva is blown out with a bubbling sound. The muscles of the face act wildly, which, with the

rapidly moving eyes, give the countenance a hideous expression. It is the most repulsive sight which the physician, who gets "behind the curtain" oftener than anyone else, is called to witness. To see a woman in her beauty and strength thus distorted and disfigured in a moment, is enough to distress the most Platonic. The storm of convulsive action slowly dies away. The movements become less violent, the lividity fades, the eyes slowly close, and after a few more twitchings of smaller muscles, relaxation comes to the distressed body so recently writhing in the most extravagant manner.

The duration of an attack varies from one to twenty minutes, and the convulsive movement is succeeded by a period of coma more or less profound. In some instances consciousness returns soon after the spasmodic movements cease, but generally after the lapse of a longer time. The patient may suddenly open the eyes as if in fright, and utter wild screams, soon quieting again into the unconscious state, or returning slowly to a comprehension of her surroundings, though not at first to the realization that anything unusual has happened. As a rule, consciousness is restored by degrees, and memory of the occurrences preceding the attack returns after several hours. Even upon complete restoration to a normal condition, it is found that many of the incidents which occurred during what appeared to be hours of sanity preceding the seizure, have wholly escaped the memory.

The first attack is nearly always succeeded at irregular intervals by others, unless effective measures for prevention are at once adopted. Eclampsia may thus be arrested, in some instances, after a single attack, while again the most vaunted remedies will utterly fail.

The paroxysms vary greatly in number. The average among those who recover is perhaps six or eight. The greatest number ever witnessed by Winckel in a case terminating favorably was seventeen. Among those ending fatally the number may rise to one hundred and sixty. Between attacks the coma, which results from cerebral congestion, becomes more and more pronounced, deepening towards death. Even in those cases which recover, the patients may lie in a state of coma for hours. Death sometimes takes place during a paroxysm, but it oftener occurs during the comatose stage, as the result of pulmonary œdema and cerebral apoplexy. When recovery ensues, as it does in the majority of instances, there is a decrease in the

frequency, duration and intensity of the paroxysms, followed by a deep, quiet sleep.

DIAGNOSIS.—To base our diagnosis on the phenomena presented by a convulsive seizure, would be unwise. The previous history of the patient, not only that immediately preceding the attack, but that also of the ante-pregnant state, should be learned, and be given due weight in making up our judgment.

Special inquiry ought to be made concerning epileptic attacks, since the phenomena of epilepsy are with difficulty differentiated from those of true puerperal eclampsia. With the onset of an epileptic paroxysm the patient utters a cry, which is usually absent in eclampsia; and after the former the succeeding coma is more prolonged.

Less difficulty is experienced in differentiating hysteria. During the attack consciousness is not wholly lost, the orderly course of the phenomena is broken, wild gesticulation and admixture of emotional symptoms usually being sufficient to reveal the character of the attack. Moreover, instead of the succeeding comatose state which follows the paroxysm of real eclampsia, evident consciousness is soon observed, even though it is sought to be hidden by the patient.

OCCURRENCE AND MORTALITY.—"Of the fifty-one cases under consideration," says Dr. Peck in his report to the American Institute of Homeopathy, in 1884, "in ten the convulsive attack anticipated labor; in thirty it manifested itself during labor, while in eleven it occurred not until after the entire completion of parturition. In the first class four mothers, forty per cent., perished, including one of whom it was at first supposed she was merely threatened with abortion. (One of the survivors suffered for a considerable time with puerperal insanity, but eventually recovered her wonted health.) Eight children were also lost, eighty per cent., one of which was the offspring of the patient just referred to; one the probable victim (though the fact was not positively stated) of a premature labor three weeks after the spasms, and one was already putrescent at delivery. In the second class eight mothers perished, twenty-six and two-thirds per cent., one of whom lingered six days after labor, and another succumbed to an attack of puerperal fever. Here but nine children were lost, or only thirty per cent. In the third class two mothers perished, or eighteen per cent. One of the survivors, who had six paroxysms within an hour, was not attacked until twenty minutes after the birth of a

dead child. Combining we find a total loss of fourteen mothers, twenty-seven and a half per cent., and sixteen children, omitting those known to be dead prior to the seizure, or thirty-one and a third per cent. The maternal mortality in cases occurring before or during labor is thirty per cent."

The results of eclampsia must be held to vary according to the severity, frequency, duration and number of the paroxysms, as well as the period in the reproductive process at which the convulsions set in. Braün says he has known but one patient to recover when attacked between the fourth and sixth months of pregnancy, except where abortion took place. When several seizures are suffered, the life of the child is nearly always destroyed, as we have elsewhere intimated.

Treatment.—Treatment of eclampsia should be considered under two heads, viz: Preventive treatment and curative treatment.

Preventive Treatment.—The prodromata of eclampsia have been mentioned, the most prominent of which were headache, disturbance of vision and epigastric pain. With these may be associated, as a still more threatening symptom, albuminuria. The first three symptoms are strongly significant, even when existing independently of albuminuria, and demand attentive consideration and faithful treatment. When there is albumen in the urine we are inclined to be influenced overmuch by this expression of pathological change to the neglect of other symptoms which may not be dependent upon the albuminuria nor directly connected with it. The subjective, as well as the objective, symptoms deserve to be accorded due weight, if we expect to give our patients the most perfect protection from the impending attack. It is under such circumstances as these that the value of our law of cure is able to manifest, with unusual force and beauty, its truth and efficiency. Of course the woman should be brought under the influence of good sanitary conditions, so that nature may not be handicapped in her efforts to restore the disordered system to perfect harmony. Among the remedies more especially suited to the cephalic, the ocular and the epigastric regions, when presenting the symptoms before mentioned, are the following:

Belladonna.—This remedy covers the symptoms more thoroughly and more frequently than any other. The headache is chiefly in the sinciput, of a congestive, pressive, boring, throbbing, or even lancinating character, worse from stooping,

from movement in general, from lying. The eyes have dimness of vision, bright sparks and flashes before the eyes, and double vision. This remedy also has the epigastric pain. Pain in the stomach, extending through to the spine, is one of its most characteristic indications.

Gelsemium.—We place this remedy as secondary only to belladonna for the premonitory symptoms of eclampsia. Neither of these has any special relation to albuminuria, which may or may not be present. Our reference here is only to the symptomatology of the case, to follow which as a guide in the selection of remedies under these circumstances we regard as the safer and more effective course. The headaches of this remedy are chiefly in the occiput, while those accompanying other symptoms of a premonitory nature in these dangerous cases are usually in the sinciput. Still the *gelsemium* headache is not confined to the occiput, but this part of the head sometimes escapes while the sinciput suffers. The headache is of a severe type, is accompanied with a sore bruised feeling, depression of the mental faculties, vertigo, dimness of vision from a haziness before the eyes, diplopia, hemiopia and even total loss of sight. The remedy covers likewise the severe epigastric pain which sometimes precedes by a few hours the convulsive seizure.

Glonoinum.—Here is a remedy which does not correspond so closely with the symptoms of these cases as usually manifested, and yet one capable of affording relief in some instances. Among its indications are the following: Fullness in head as if all the blood had mounted to it; throbbing in front head; crushing weight across forehead; pressure and throbbing in temples; holds head with both hands on the sinciput; flashes of light before the eyes; eyes red; and violent pains in the epigastrium. Each of the above remedies has insomnia well marked, and this is often a most distressing symptom in association with those already mentioned.

Among other remedies which may be indicated by the more prominent precursory symptoms, are these, *arsenicum, bryonia, nux vomica, melilotus* and *cicuta.*

Albuminuria constitutes one of the most threatening symptoms, but its treatment has been described at some length in another place, and therefore requires no special consideration here. We may add, however, that the above-mentioned remedies, though not all of them peculiarly suited to the relief of albuminuria, as viewed from a physiological standpoint, may

yet afford perfect results in that direction, if specially indicated by other symptoms. Likewise, the remedies named under albuminuria may cure the accompanying headache and other disturbances.

Curative Treatment.—It will be modified more or less by the period at which the convulsions are developed.

When eclampsia sets in during pregnancy, and the paroxysms are not brought under control, the question of inducing labor has to be settled. The advisability of the operation is advocated by some and denied by others; and in the absence of a settled rule of action, the question will have to be considered and settled in individual cases as they arise. It certainly ought not to be undertaken unless other measures have utterly failed, for the results of the operation, as thus far observed, are not reassuring.

In many instances the uterus is excited to action by the convulsions, and dilatation of the os begins, the case being resolved thereby into one of eclampsia during labor, to be managed accordingly.

Convulsions which set in after labor has begun have a tendency to recur until the parturient act is completed, and then to cease. It is therefore advisable to hasten delivery by every obstetrical resource which is not inimical to the woman's safety. During the first stage the means at command are rupture of the membranes, catheterization of the uterus, and manual dilatation; and during the second stage, use of the forceps. In case of malpresentation, or of a certain degree of contraction of the pelvic brim, it may be advisable to practice podalic version before complete dilatation of the os uteri.

"At the recurrence of the fit," says Dr. R. Ludlam," a thick piece of india rubber, or of soft wood, should be placed between the teeth, in order to protect the patient's tongue. She should not be held forcibly or firmly to the bed, but simply prevented from throwing herself on the floor or otherwise inflicting bodily injury. Too much constraint might increase the difficulty, and would do no good. If she has an antipathy to the nurse, the husband, or anyone in the room, you had better send them out. And do not let bystanders give vent, in her hearing, to exclamations of fright and horror at the contortions of which they are witnesses."

THERAPEUTICS.—Among the curative remedies for this disease, none occupies so prominent a place as *belladonna*. "No

remedy," says Baehr, "responds to this disorder as completely as belladonna." The indications for its use, according to Guernsey, are as follows: She has the appearance of being stunned; a semi-consciousness and loss of speech; convulsive movements in the limbs and muscles of the face; paralysis of the right side of the tongue; difficult deglutition; dilated pupils; red or livid countenance. She may have paleness and coldness of the face, with shivering; fixed or convulsive eyes; foam at the mouth; involuntary escape of the fæces and urine; renewal of the fits at every pain; more or less tossing between the spasms, or deep sleep with grimaces; or starts and cries with fearful visions. The efficacy of belladonna has been repeatedly demonstrated.

Cicuta virosa.—We have found but little reported experience with this remedy in eclampsia, but we believe it one of great promise. It has, as we have before shown, the symptoms which usually precede an onset of the convulsions, and from these alone would be well indicated; but, in addition, it has loss of consciousness; facial distortion, either horrible or ridiculous; red, bluish, puffed countenance; dilated pupils and insensibility of the eyes to light; eyes staring, fixed and glassy, or upturned; convulsions, with loss of consciousness, frightful distortion of limbs and whole body.

Gelsemium.—This has proved to be a remedy of remarkable value in this disorder. It is especially indicated when attacks are excited through reflex causes. One of its prominent symptoms, sometimes observed as premonitory of an attack, is a large feeling of the head. The pulse is full, but not usually hard; or it may be rapid and feeble. For some hours before the attack, and in the intervals, she is extremely dull.

Veratrum viride.—The strongest indication for this remedy is found in high arterial tension and circulatory excitement. Apart from these indications, it has been used, in great measure, empirically; still it has done much good service.

Following are indications for other remedies, many of which, when thereby chosen, have often proven efficacious:

Argenticum nit.—Seizures preceded by restlessness, and a sensation of general expansion, especially of head and face.

Cocculus.—Convulsions following difficult labor, and those which appear to be brought on by changing position; before the attack the patient complains of a sense of great weakness, especially of the lower limbs.

Cuprum met.—Spasms during pregnancy, of a clonic nature, beginning in one part and spreading; convulsions during parturition, with violent vomiting, or with every paroxysm opisthotonos, spreading of the limbs and opening of the mouth.

Glonoinum.—Unconsciousness; face bright red, puffed; full, hard pulse; urine copious and albuminous.

Helleborus.—Convulsions, with scanty urine; urine dark, floating dark specks, or albuminous.

Hyoscyamus.—Shrieks, anguish, chest oppressed; unconsciousness; jerking of every muscle in the body, including those of the eyes, eyelids and face; convulsions preceded by insomnia.

Opium.—Convulsions during and after labor; drowsiness, open mouth, coma between paroxysms; convulsions which appear to have been excited by fright or grief; stertorous respiration sets in soon after convulsions begin.

Pulsatilla.—Convulsions following sluggish or irregular labor pains; unconsciousness; cold, clammy, pale face; stertorous breathing, full pulse.

Secale.—Labor ceases and convulsions begin.

Stramonium.—Bright light, or contact, renews the paroxysms; arouses with a shrinking look, as if afraid of the first object seen.

We do not feel that an account of remedial measures would be ample without allusion to other remedies than those already mentioned, and some, too, which, in their common use, are chiefly palliative. Our law of cure is probably universal in its application, but it is still so imperfectly understood in its details that, to rely implicitly and exclusively upon it, in the presence of a dire emergency, is scarcely justifiable. These remedies which follow are not recommended to substitute homeopathic medication, but as mere expedients, by means of which to gain time for the selection and exhibition of the true similimum.

As a temporary expedient, to prevent the early recurrence of a convulsion, *chloroform* may be used to the extent of complete narcosis; but it is not a remedy whose action can safely be long maintained.

Chloral hydrate is a remedy which will produce an effect on the system similar to that of chloroform, and may be continued for an indefinite period. In such cases it cannot well be admin-

istered by the mouth, but its effect can be as effectually secured through the rectum. The bowel should be cleared through the use of an enema, and then the chloral injected in the dose of sixty to one hundred grains. This may be repeated once, twice or thrice, if necessary, within a few hours. The usual formula for the injection is:

New milk	oz. iij.
Egg	one yolk.
Chloral hydrate	grs. xc.

To a homeopath this may seem like heroic dosing, but for the purpose named, a much smaller quantity of the drug would have little effect.

Opium has been highly praised for its effect to quiet the perturbed nervous system in these desperate cases. It is best administered in the form of morphia by hypodermic injection. One-fourth to one-half grain, in repeated doses, is sometimes used. This mode of treatment has received strong endorsement from old-school authorities.

Reliable statistics representing the results of various forms of treatment are not easily obtained; but from all we can gather on the subject, we are fully justified in saying, that, as between the two prominent modes of treatment upon which the old-school has learned to rely, namely, that by opium and that by chloral, the advantage appears to be on the side of chloral.

We regard the hot wet pack as a most valuable agent in the treatment of eclampsia. Seemingly hopeless cases sometimes yield to it. It should be given by wringing out four blankets from hot water and wrapping all but the head in them. Upon the latter should be laid cloths wrung from ice-cold water.

Under any form of treatment the mortality is appalling. At the same time later reports indicate improvement in this direction, proceeding largely, no doubt, from the growing custom of women to place themselves under the care of physicians during gestation.

Relaxation and Disruption of the Pelvic Articulations.—Relaxation, or violent disruption of the pubic joint and of the ilio-sacral synchondroses, has been described by several. The symptom most characteristic of such cases is the difficulty, or impossibility, of sitting or standing erect. There is pain or uneasiness in the pelvic region, and a sense of weakness and un-

steadiness in the bones, with a sense of relief afforded by a tight bandage about the hips. Such a bandage, and absolute rest, constitute the best treatment.

Inflammation and suppuration of the pelvic joints are occasional occurrences. When recognized, the pent-up matter should be drawn away, and constitutional treatment adopted.

PART III.

LABOR.

CHAPTER I.

CAUSES AND CHARACTER OF LABOR.

We have glanced at the phenomena associated with impregnation; we have traced the growth and development of the fœtus to maturity; we have considered the diseases and accidents to which the fœtus is liable; the phenomena and management of its premature expulsion, and we now come to that part of our subject which treats of its expulsion at the close of mature utero-gestation, a period which, in the human female, is accomplished in about ten lunar months from the date of impregnation.

The Causes of Labor.—"Speculation as to the proximate causes of labor," writes Lusk, who reasons very learnedly on the subject, "have so far proved profitless. The following particulars comprise the extent of our knowledge of the conditions which prepare the way during pregnancy for the final expulsive efforts:

"1. During the first three months the growth of the uterus is more rapid than that of the ovum, which is freely movable within the uterine cavity, except at its placental attachment. In the fourth month the reflexa becomes so far adherent to the chorion that it can only be separated by the exertion of some slight degree of force, and the amnion is in contact with the chorion. After the fourth month the chorion and amnion are agglutinated together, though even at the termination of pregnancy they may with care be separated from one another. After the fifth month the agglutination of the decidua vera and reflexa takes place. In the second half of pregnancy the rapid development of the ovum causes a corresponding expansion of the uterine cavity, the uterine walls becoming thinned, so that by the end of gestation they do not exceed upon the average two or three lines in thickness. The vast extension of the uterine surface is not, however, simply a consequence of overstretching, a fact shown by the circumstance that the uterus

towards the close of gestation is increased nearly twenty-fold in weight, and by the histories of extra-uterine fœtations, in which, up to a certain limit, the uterus enlarges progressively, in spite of the non-presence of the ovum. The augmented weight of the uterus is the result of the increase in length and width of the individual muscular fiber-cells, the extreme vascular development, and the abundant formation of connective tissue. Up to the sixth and a-half month there has further been observed a genesis of new fiber-cells, especially upon the inner uterine surface. According to Ranvier, the smooth muscular fibers become striated as the end of gestation is reached.

"The precise manner in which the distension of the uterus is accomplished has as yet not been demonstrated. *A priori* only two possibilities are apparently admissible, namely, either the individual structure elements are stretched after the manner of elastic bands, or a rearrangement of the muscular elements takes place in such wise that a certain proportion of the fiber-cells, instead of lying, as in the beginning of pregnancy, parallel to one another, gradually, with the advance of gestation, are displaced, so that the ends only are in juxtaposition. It is possible, though not proved, that towards the close the thinning of the walls is the result of both conditions. Bearing these premises in mind, it becomes a disputed question as to whether one of the causes of labor is not to be found in the reaction of the uterus, as a hollow muscular organ, from the extreme tension to which its fibers are ultimately subjected. Countenance to the affirmative side is afforded by the tendency to premature labor in hydramnion and multiple pregnancies, in which a high degree of tension is reached at a period considerably antedating the complete development of the fœtus.

"2. There is a perceptible increase of irritability in the uterus from the very beginning of gestation. Indeed, the facility with which contractions may be produced by manipulating the organ through the abdominal walls has been put forward by Braxton Hicks as one of the distinguishing signs of pregnancy. This irritability is especially marked at the recurrence of the menstrual epochs, and becomes a more and more prominent feature in the latter months, when spontaneous painless contractions are ordinary incidents of the normal condition.

"3. The researches of Friedlander, Kundrat, Engelmann and Leopold have demonstrated that the decidua vera of pregnancy

is distinguishable into an outer, dense, membranous stratum, composed of large cells resembling pavement epithelia, probably metamorphosed cylindrical cells, and an (in appearance) underlying meshwork, formed from the walls of the enlarged decidual glands. It is in this spongy layer that the separation of the decidua takes place, the fundi of the glands persisting, even after expulsion of the ovum. By many, a fatty degeneration of the cells of the decidua has been observed towards the end of pregnancy, but Leopold, Dohrn, and Langhans have shown that this is not of constant occurrence. The trabeculæ which enclose the spaces of the network, diminish in size with the advance of pregnancy. Thus, while they measure at the fourth month about 1.500 of an inch in thickness, they become

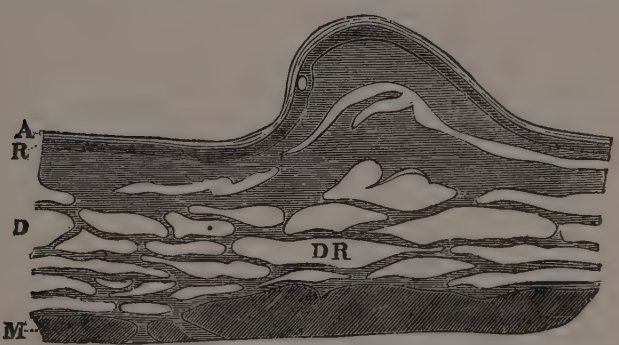


Fig. 124.—The Uterine Mucous Membrane. A, amnion. R, reflexa. D, decidua vera. D R, glandular spaces of the lower stratum. M, muscular structure. (Englemann,)

gradually reduced in the subsequent months to 1.2500 of an inch, a change which materially facilitates the peeling off of the decidual surface.

"4. From the fifth month onwards, large-sized cells make their appearance in the serotina, especially in the neighborhood of thin-walled vessels. The largest of these so-called giant-cells contain sometimes as many as forty nuclei. Though a physiological product, they resemble, for the most part, the so-called specific cancer-cells of the older writers. They are of special obstetrical interest from the fact observed by Friedlander, and confirmed by Leopold, that they penetrate the uterine sinuses from the eighth month, and lead to the coagulation of the blood, and to the formation of young connective tissue, by means of which a portion of the venous sinuses become obliter-

ated before labor begins. The subtraction of these vessels from the circulation tends to increase the amount of the venous blood in the intervenous spaces of the placenta.

"5. It is proper to recall here the fact that the nerve filaments of the uterus are derived, in principal measure, from the sympathetic system. The large cervical ganglion, which in pregnancy measures about two inches in length by one and a-half inches in breadth, receives, however, in addition to the sympathetic fibers, the second, third and fourth sacral nerves.

"Physiology has as yet left unsettled the question as to the main channels of the motor impulses which are conveyed to the uterus during labor. One of my hospital patients, with paralysis of the lower extremities, retention of urine, and loss of power over the sphincter ani muscle, had a perfectly natural though painless labor. The cause of the paralysis was obscure, the patient subsequently making a complete recovery. Jacquemart reports a similar case, in which the paralysis was due to partial compression of the cord at the level of the first dorsal vertebra. On the other hand, Schlesinger has shown that the sympathetic is not the only motor nerve, as reflex movements of the uterus follow stimulation of the organ when all the branches of the aortic plexus have been carefully divided.

"A motor center for uterine contractions has been proved to exist in the medulla oblongata. This center is excited directly to action by anæmic conditions, and by the presence of carbonic acid in the blood conveyed to it. Vivid mental emotions may either awaken or suspend uterine contractility.

"Reflex movements of the uterus may be provoked by stimulating the central end of the spinal nerves,—a fact which serves to explain the consensus long recognized as existing between the breasts and the organs of generation. When the spinal cord is divided below the medulla oblongata, this phenomenon is no longer observed. Direct stimuli to the uterus, however, determine contractions independently of the medulla oblongata, the spinal cord then acting as a reflex center. The presence of asphyxiated blood in the arterial trunks acts as a physiological stimulus to labor. By the separation of the decidua from its organic connection with the uterus, the ovum acts as a foreign body, and, as is well known, speedily awakens uterine movements. Finally, Kehrer has shown that, when a cornu is removed from the uterus during labor, rhythmic contractions of the muscular fibers will continue from a half-hour

to an hour after separation, provided only the tissues be kept moist and at a suitable temperature.

"The following theory of the causes of labor is offered, not because of its completeness, but merely as a means of grouping the foregoing facts together in the order of their relative importance. The advance of pregnancy is associated with increase in the irritability of the uterus, a property most pronounced at the recurrence of the menstrual epochs. By thinning of the partitions between the glandular structures the way is prepared, as the time for labor approaches, for the easy separation of the dense inner stratum of the decidua. The ready response of the uterus to stimuli reflected from the peripheral extremities of the spinal nerves, to direct local irritation, and to the presence of blood surcharged with carbonic acid in the uterine vessels, explains the frequency of painless contractions for days, or even weeks, in some cases, previous to labor. To these means of exciting uterine motility there should be added, in all probability, the reaction of the uterine muscle, from the tension to which it is subjected by the growth of the ovum, and to the circulatory disturbances in the cerebral centers sometimes effected by vivid emotions. Frequently repeated uterine contractions, without partial separation of the decidua, are hardly comprehensible after the decidua vera and reflexa are brought into close contact with one another. Such a physiological separation would, of necessity, when of sufficient extent, by converting the ovum into a foreign body, furnish an active cause for the advent of labor, in the same way that labor is prematurely excited by a similar separation when artificially induced. Thus, by the time the development of the fœtus is completed, all things are in train for its expulsion. When other causes do not early operate as determining forces, the increase of uterine irritability at the recurrence of the menstrual epochs probably accounts for the ordinary coincidence of labor with the tenth catamenial date."

The Expelling Powers.—The power by which expulsion of the fœtus is effected resides chiefly in the uterine muscular structures themselves. While this is true, every attentive clinical observer soon learns that much aid is afforded by the abdominal muscles, and a little by the feeble contractions of the vagina.

The Uterine Contractions.—The general form of the uterus towards the close of utero-gestation is oval; but when in a

state of contraction the longitudinal and transverse diameters are diminished, while the antero-posterior is increased, rendering the organ more globular. One very marked feature of the uterine efforts is their intermittent character, coming and going at gradually narrowing intervals. The action is also peristaltic, beginning at one extremity and sweeping to the other in a powerful wave of muscular energy. Whether this action proceeds from fundus to cervix, or from cervix to fundus, is still a matter of dispute. It is said by most careful observers that the contraction sets in at the fundus and flows to the cervix, whence it returns in a wave to the fundus, and this accords with the author's observation. As the fingers rest against the presenting head, the first indication of an approaching contraction is found, not in the patient's uneasiness, nor in the contraction of the cervical muscles, but in descent of the presenting part into the pelvis. We are often able to notify the patient of the coming pain before she herself is aware of its approach. This clinical observation is good evidence that the contraction does not begin in the cervix. We have also found that, if one hand be placed on the fundus uteri and the fingers of the other on the cervix, contraction will be first felt at the fundus of the organ.

Uterine contraction, of a forcible character, is nearly always accompanied by pain, in the early stage of a cutting and sawing nature, in the second stage of a bearing and disruptive sort. At the same time it should be remembered that contractions of a forcible kind only are usually painful, contractions without pain occurring throughout the greater part of pregnancy without producing any unpleasant sensation.

Uterine action rarely sets in with force and energy, but in an indolent and feeble manner, owing probably to the weakness of the stimulus exerted at the beginning. Slowly the contractions gather strength and energy, until, at the close, they become terrific. The limit of intra-uterine development having been reached, and the fœtus having become in a sense a foreign body, nature begins in a mild and hesitating way to suggest that it leave the nidus which it has outgrown. The repeated contractions begin dilatation of the os uteri, the relations between the uterus and membranes are more and more severed, and in this manner a stronger reflex action is excited. At a later period the stretched cervix, the distended vagina and vulva, and the compressed nerves, augment the action to an almost unbear-

able degree. At the beginning the pains may be separated by an interval of an hour; but as they increase in force they return at shorter intervals, until, during the latter part of the propulsive stage, they may be almost continuous. The average duration of a labor-pain is about one minute, or perhaps a little less. Contractions come and go without consulting the will of the patient who is fortunate enough to be the subject of them, and are unresponsive to her volition. The motor centers of the uterus are located chiefly in the sympathetic ganglia. It has been suggested that the anterior sacral nerves may perform an inhibitory office.

When the membranes are unruptured, the bag of waters, being the part in advance, is made to press at the os uteri and gradually expand it. If the membranes are ruptured, the presenting part of the fœtus performs the office, and usually performs it nearly as well. Prior to the beginning of labor the internal os yields to a considerable degree, so that a few pains usually suffice to make the cervical canal a part of the uterine cavity. The external os follows, and, before dilatation is completed, the lips of the os become extremely thin from the stretching imposed upon them. After the bulk of the head passes the cervix, retraction of the os from the head rapidly follows, and the fœtus lies with its head in the vagina and its trunk in the uterus, the two cavities thus being opened to form a common canal.

By placing the hand on the globe of the uterus, as it contracts with force during labor, we may readily determine that the uterus displays much energy and contractile power. This power of the uterus is more sensibly felt when the hand is introduced into the organ for such a purpose as version, while the patient is not under the influence of an anesthetic. The contractions vary much in intensity, both in different cases and in the various stages of the same case. Just what the degree of power thus exerted is in different subjects has long been a matter of curious inquiry, and attempts have been made to measure it. While the results of such researches have not been highly satisfactory, owing to the difficulties surrounding the investigations, they may be accounted valuable data. Dr. Matthews Duncan, after repeated experiment and study, found that the force required to rupture the strongest membranes, with an os uteri 4.50 inches in diameter, was about 37½ pounds. He collected, further, that, in ordinary labor, the propelling

force is from six to twenty-seven pounds. In cases where unusual effort is made, the propulsive power exerted by the uterus, the abdominal walls, and the other forces at the woman's command, may be increased to eighty pounds. Poppel found that an average force of five pounds is required to rupture the membranes when the dilatation has attained a diameter of 1.9 inches. He found that the average force necessary for expulsion of the fœtus varies from four to nineteen pounds. Ribemont's experiments showed that when the diameter of the os amounts to 3.9 inches, the average pressure necessary to produce rupture is twenty-three pounds. Schatz, who entered into a thorough scientific investigation of the question, arrived at the conclusion that the power necessary to accomplish fœtal expulsion varied from seven to fifty-five pounds.

Effect of the Pains on Mother and Fœtus.—One very marked effect of the uterine contraction is increase of the arterial pressure. This probably grows out of the restriction of circulation through the uterine walls. But, since there is a great degree of nervous excitement associated with the movement, the rapidity of pulsation, instead of being diminished as usual in proportion to the degree of increased tension, is increased. The respirations are usually diminished in frequency, but sometimes, especially in nervous sensitive women, the increase is quite marked. The temperature is slightly elevated, and the urinary excretion, in consequence of the arterial pressure, is augmented.

The fœtal circulation is decidedly affected by the uterine contractions, so that, during a pain, the heart-sounds are scarcely audible, even in those cases wherein they at other times are unusually distinct. This action on the heart is attributed by Schwartz to an increased intra-cardiac pressure, by Schultze to slight asphyxia from placental compression, and by Kehrer to compression of the cranium and its contents.

Vaginal Contractions.—As the presenting part of the fœtus passes through the os uteri and enters the vagina, it at first meets with resistance. Distension becomes so great as temporarily to paralyze the force of the few muscular fibers of this tube; but, after the moment of greatest distension is passed, they regain a certain amount of the lost energy and contract down upon the receding fœtus, and ultimately aid in expelling the placenta.

Abdominal Aid.—The aid afforded by the abdominal mus-

cles has a marked effect on the progress of labor, but it is not invoked until the advent of the propulsive stage. The action of these muscles differs from that of the uterus, in that it is in a measure voluntary. Still, it is found that, at the height of a bearing-pain, the action partakes of the nature of tenesmus, and becomes absolutely uncontrollable. Contraction of the abdominal muscles aids in the following way: The extremities are pressed against some firm support, or otherwise fixed, and the trunk is thus rendered firm; then by deep inspiration the diaphragm is pushed downwards while the abdominal muscles are held tense, and a powerful downward pressure is thus exerted on the uterine contents. The aid thus afforded is of the greatest value in the accomplishment of rapid and effectual parturition.

The Pains of Labor.—The location and character of labor-pains vary not only with the parturient stages, but also with the woman's peculiarities. In sensitive women they are extremely agonizing, and sometimes overwhelming; while in those of more obtuse sensibility they are not so keenly felt. During the first or preparatory stage the pain is of a cutting, sawing or grinding nature, and is felt chiefly in the hypogastric, or lumbo-sacral region, or in both. From the back the pains radiate forwards and downwards into the abdomen and thighs. The hypogastric pains extend into the groins. During the second stage of labor the lumbo-sacral region is, as a rule, the seat of greatest suffering, until, towards the close, it is transferred to the sacrum, rectum, and vulva. The pains themselves are greatly changed during this part of labor, becoming of a tearing, distensive, luxative character. Meigs offers some very excellent observations on this subject. "The pain felt in labor," he says, "is owing to the sensibility of the resisting, and not to that of the expelling, organs. Thus the sharp, agonizing and dispiriting pains of the commencement of the process, which are called grinders, or grinding-pains, are surely caused by the stretching of the parts that compose the cervix and os uteri and upper end of the vagina. Pains are rarely felt in the fundus and body of the organ; and nineteen out of twenty women, if asked where the pain is, will reply that it is at the lower part of the abdomen, and in the back,—indicating, with their hands, a situation corresponding to the brim of the pelvis, and not higher than that,— a point opposite the plane of the os uteri. When the pains of dilatation are com-

pleted, and the fœtal presentation begins to press upon the lower part of the vagina, the pain will, of course, be felt there, and is finally referred to the sacral region, the lower end of the rectum and perineum. The last pains which push out the perineum, and put the labia on the stretch, will of course be felt in those parts chiefly. The sensation, under these circumstances, is represented as absolutely indescribable, and certainly as comparable to no other pain."

Meigs was an excellent clinical observer and teacher, but, in a fair view of all the facts, it does not seem probable that the foregoing is altogether true. Reasoning from analogy, we infer that a forcible contraction of an organ like the uterus is, in itself, productive of more or less pain. This inference is justly derivable from a study of after-pains, and from violent contractions of other organs. There are other clinical observations which throw some light on this question, among which we may mention the phenomenon of misplaced or metastatic labor-pains. In these cases, the pain, instead of being located in its usual place, is felt mainly, or exclusively, in other parts of the body. The head, the eyes, the legs, or indeed almost any part, may be the point of attack. Dr. B. Fordyce Barker reported a case to the New York Obstetrical Society, a number of years ago, in substance as follows: He recently attended a lady in her confinement who was in labor but two hours, though the pains did not seem at any time to center about the pelvis. There were no uterine pains at all, but, with each contraction of the womb, pain was experienced in the legs. The pain was not localized, nor was there any muscular contraction of the legs. The same pain was produced in pressing off the placenta. Weigand relates a case in which severe infra-orbital pain occurred with every uterine contraction. Dewees mentions one in which the pains were felt in the calves of the legs.

Mattei attributes the lumbar pains to pressure of the uterus against the spinal column, and Beau to lumbo-abdominal neuralgia, like that accompanying uterine troubles disconnected with pregnancy.

The pains of labor increase in intensity as labor progresses, but, as a rule, those of the propulsive stage are borne with more fortitude than those of the first stage. Lamentations are nearly always louder and more touching during the stage of dilatation, and the nervous symptoms are at this time more prominent. The reason for this is probably found in the

absence of any appreciable advancement during this stage, and the consequent discouragement growing out of the feeling that all the pain is of no avail. The fact also that the effort is of an involuntary sort, has the effect to make the suffering more unbearable than that accompanied by a strong voluntary struggle.

The terms "forcible pains," "weak pains," "deficient pains," etc., are commonly used to characterize different phases of the distressing process. It will be understood that the substantive "pain" is here synonymous with "contraction." Pain is merely the sensible evidence of uterine action. When the organ contracts with energy, the pains are usually severe; and when it acts feebly, the pains are correspondingly light. The terms "vehement," "powerful," "forcible," "weak," "deficient," "inefficient," etc., are only relative, that is to say, they do not express a definite degree of either quality or quantity.

CHAPTER II.

CLINICAL COURSE AND PHENOMENA OF LABOR.

The Stages of Labor.—By what has preceded we have been brought to a point where it is proper to enter upon a consideration of the clinical course of labor in its normal phases.

One cannot long be in the active practice of obstetrics without observing that the process of parturition is very naturally divided into distinct stages, each characterized by its own peculiar phenomena, and the whole linked together into a remarkably uniform sequence of events. The first is in a measure a preparatory stage, during which the pains operate to open up the os uteri, and get things in order for descent of the fœtus through the parturient canal. The second is the stage of propulsion, during which the fœtus journeys through the pelvis and emerges at the vulva. The third comprises separation and expulsion of the secundines. The first stage ends, then, with full dilatation of the os uteri; the second with complete expulsion of the fœtus; and the third with separation and extrusion of whatever of the product of conception and the immediate result of it is left behind.

THE FIRST STAGE.—This properly begins with development of the first symptoms of actual labor, though the precise moment cannot always be determined. There is a certain amount of preliminary action which has been very properly termed the preparatory stage. This is often well marked, while at other times it is so indistinct as to escape detection.

One of the most common changes occurring toward the close of pregnancy is what has been elsewhere alluded to as subsidence of the uterus, with a falling forwards of the fundus. When well marked, this change of relations and position is followed by considerable relief of the gastric disturbances which so often render the woman most uncomfortable in the latter part of pregnancy. Locomotion may for a time be more difficult, while downward pressure of the uterus produces a frequent desire to urinate, and often, to defecate. Proceeding partly from this cause, and partly from interference with the portal circulation by general intra-abdominal pressure, hemorrhoids are liable to make their appearance for the first time, or, in old cases, become greatly aggravated. This subsidence of the

uterus is commonly more marked in primiparæ than in multiparæ, and hence we find the presenting head, covered by the uterine walls, low in the pelvis more frequently in the former than in the latter. Subsidence of the fundus uteri is not brought about, however, wholly by a descent of the whole organ, but there is likewise a lessening to a small degree of the longitudinal measurement of the same, as though the organ were gathering itself for the final struggle.

For a variable time before the advent of labor, the woman usually observes a muco-sanguineous discharge from the vagina, accompanied by a sense of dragging in the sacrum and pubis, and of tension in the abdominal region. Moreover, as a result of the painless uterine contractions which go on throughout the greater part of pregnancy, and an aggravation or augmentation of which constitutes labor, the cervical canal may become dilated, in multiparæ, to a considerable degree several days before labor.

The moderate, intermittent, and usually painless, contractions of the uterus, just alluded to, may in certain women of susceptible natures, and especially those of a rheumatic diathesis, give rise to pain, and constitute what are known as false pains. These we believe to be the exceptional, rather than the common cause of these painful sensations. False pains are usually irregular, often strong at first, but gradually becoming weaker; are limited in extent, rarely dilate the os or protrude the bag of waters, and are not generally accompanied by the muco-sanguineous discharge which usually precedes real labor. They arise chiefly from indigestion, cold, movements of the fœtus, and various other causes, and are dispelled by remedies calculated to remove the causes on which they depend. False pains arising from hyperesthesia of the sensitive nerves and occasioned by the uterine contractions peculiar to pregnancy, are best relieved by *caulophyllum*. *Pulsatilla, arnica, bryonia,* and other remedies may be found useful.

In a certain proportion of cases labor sets in abruptly, with severe and quickly-recurring pains, but as a rule the onset is gradual, and the pains are so far apart and so feeble that their real significance is not at first recognized. More painful contractions, however, soon ensue, creating restlessness, and causing all the phenomena peculiar to labor. Women greatly differ in their sensibility to pain, and the positions which they assume, and the movements which they make during labor are

correspondingly diverse. Some instinctively seek the bed and keep it throughout the parturient act, others prefer to sit or stand until the first stage is nearly finished, while others can scarcely be driven into a recumbent posture till the very close of the second stage. If sitting, the woman during the severe part of the first stage is usually disposed to throw the trunk of the body forwards as the pain comes on, resting her weight on the hands which press the thighs, or she bends backwards with the hands on the loins. The earlier pains rarely extort cries, but, when the os has reached a certain degree of dilatation, the suffering becomes so severe as to create great restlessness and bring out some exclamations of distress. Occasionally the woman's fortitude is so great, or the pain so slight, that no sound of distress escapes her lips during either the first or second stage.

True labor pains usually manifest their impression on the os uteri without much delay, and therefore labor may be said generally to begin with the first indication of expansion or reduction of this part, provided there is evidence of strong, recurrent, coincident uterine effort. The expansion then begun progresses gradually—sometimes rapidly, until the entire cervical canal becomes large enough to admit of uterine evacuation. As the os internum opens, the contractions cause the membranes to descend and exert an expansive force on the cervical canal. During a pain the membranes become tense, and bulge through the opening to a greater or less degree, until, after a certain amount of expansion has been attained, they resemble the form of an old-fashioned watch crystal. This is true, however, only after the internal os has entirely yielded, and the edges of the external os have become thin from the pressure put upon them. As the pain subsides, the os relaxes and the membranes retreat. With the advance of labor, the pains increase in intensity, frequency and force, while uterine dilatation is usually progressive. Nausea and vomiting are not infrequent, and when present they add greatly to the woman's distress, though their effect on labor is often salutary. The softening, relaxation and hypersecretion evinced in the soft structures, become more and more decided, and when the expansion has reached a certain limit, say a diameter of two and a-half or three inches, the protruding membranes commonly rupture, and a considerable part of the liquor amnii escapes with a gush. Sometimes all the amniotic fluid escapes as shown by the sequence, but usually a

part of it is prevented from doing so by descent of the presenting part, and is retained till final escape of the fœtus.

The pulse increases in frequency in proportion to the severity of the pain, its acceleration being determined by the exercise of muscular energy. This effect on the circulatory apparatus may be usefully employed, some say, as a gauge of the efficiency of the pains, for, the more marked and uniform the variation, the more effective the contraction. "When, however," says Hohl, "the rapidity of the beats subsides before approaching the maximum, the pain is too weak; or when the rapidity rises

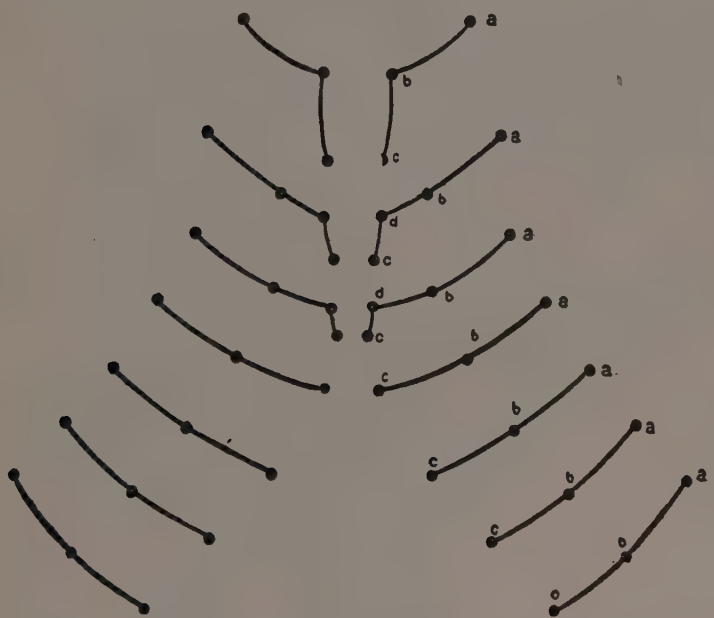


FIG. 125.—Showing various stages of Dilatation. C, os tincæ. B, os internus.

by sudden starts, the pain is a hurried one, and in either case its effect will be imperfect." The pulse acceleration, under an efficient pain of average duration, he represents by the following record of the several quarters of two minutes: 18, 18, 20, 22: 24, 24, 22, 18.

This may all be true, but we have found the pulse of little value as a means of determining the efficiency of uterine action.

The softening, relaxation, and hypersecretion become more and more decided. The blood found on the examining finger

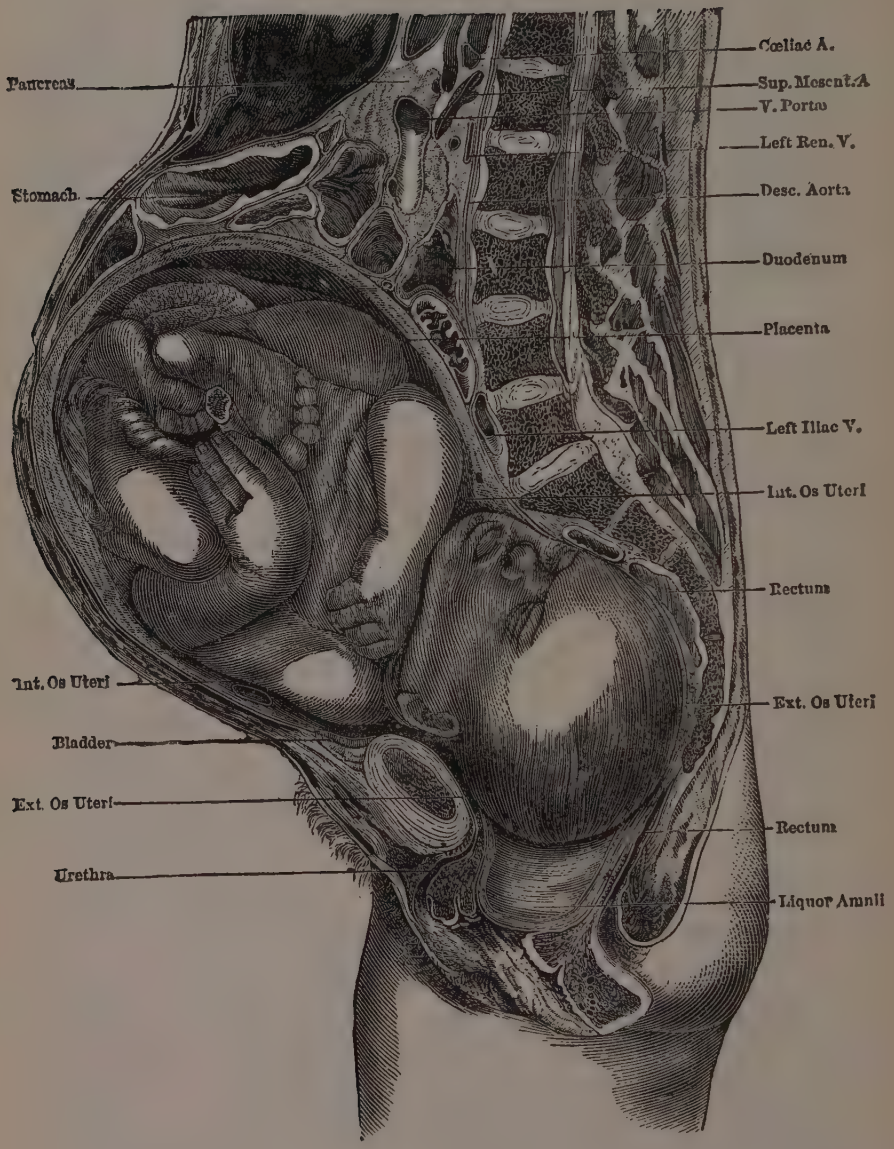


FIG. 126.—Section of a frozen body at the termination of the first stage of Labor. The membranes are still intact, the cervix is fully dilated, and the head, occupying the second position, is in the pelvic cavity.

and which tinges the mucus, proceeds mainly from the decidua and the uterine walls with which it is in contact, since the former, owing to a gradual giving way of the os uteri, is being torn away from its maternal attachments. After a time, the head, influenced by uterine contractions, descends into the cervix, the walls of which are separated until they lie against the pelvic borders, and thereby form, with the uterine cavity and vagina, a continuous channel known as the parturient canal. This, the first stage of labor, varies greatly in duration but is generally completed in six or seven hours. It sometimes lasts but an hour, and on the other hand, it is occasionally protracted to one, two or three days.

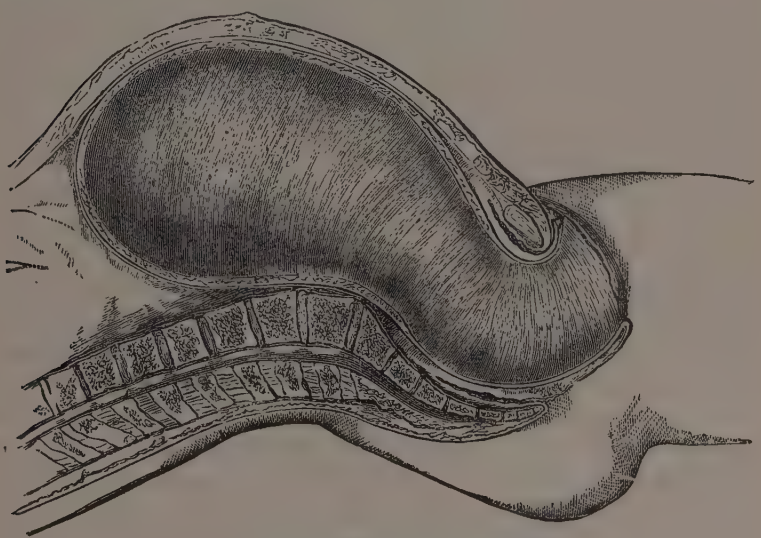


FIG. 127.—The Parturient Canal.

The Mechanism of Dilatation.—It appears to be pretty generally conceded that the so-called bag of waters acts as a kind of entering wedge, by means of which an equitable hydrostatic pressure is brought to bear in the direction of expansion, and that this is the mechanism through which dilatation of the os uteri is mainly effected. Leishman reasons learnedly and forcibly on the subject as follows: "The first efficient contraction having resulted in an opening of the os to a trifling extent, and the tissues being sufficiently relaxed to admit of satisfactory progress, we are enabled to trace the process of dilatation through all its subsequent stages. As soon as the os

has yielded to a certain extent, the membranes which are here separated from their uterine attachment, commence to protrude in the form, first of a watch-glass, and then of the extremity of a pouch or bag, which has been termed the "bag of waters." Following the operation of a very obvious law already alluded to, this phenomenon implies, primarily, an attempt, consequent on the uterine contraction, on the part of the waters, to escape in the direction in which resistance is least. The special function, however, of this bag is to effect the further dilatation of the os, and we can conceive of no means which could be more admirably adapted to this object than the graduated fluid pressure which is thus brought to bear upon the os equally in its whole circumference. It constitutes, in fact, in its action during a pain, a hydro-dynamic force, which acts at once safely and powerfully upon the whole of the os."

Theoretically this action of the bag of waters is very decided, but when we reflect upon all the conditions, we are led to doubt its practical effect. Moreover, every obstetric practitioner of much experience has surely observed that in many instances (we believe in at least thirty or forty per cent. of all cases) there is no well formed bag of waters, and, during a pain, but little fluid can be felt between the unbroken membranes and the head. In such labors hydrostatic dilative force is necessarily an unimportant factor. These cases, combined with those in which early rupture of the membranes takes place either spontaneously or artificially, rendered quite true Cazeaux's remark,—"In general, it (dilatation) is very slow in the commencement of labor, but much more rapid towards its close." This statement he in another place explains by saying, "The fœtus evidently has no part in the dilatation of the os uteri until the bag of waters is ruptured. It is not until after this event takes place that the vertex, by engaging like a wedge in the uterine neck, can hasten the dilatation mechanically; and it is equally evident that in any other than a vertex presentation, the presenting part being more voluminous and irregular than the head, cannot perform the same office, and therefore, *ceteris paribus,* the orifice will open more slowly."

But in those cases wherein a bag is felt, what service does it render? This, of course, we are not able, even by the most careful experiment, to determine, since the conditions which exist in labor cannot be artifically duplicated. In considering the question it must be borne in mind that the entire liquor

amnii is not available for the exertion of expansive force at the os, owing to firm pressure of the head, during uterine contraction, against the pelvic brim and the soft tissues thereabout. This may be demonstrated by rupture of the membranes during a pain, even in instances of fully developed bags, the amniotic fluid confined below the head being the only part which then escapes. There are doubtless exceptions to this rule, as, for example, those instances in which the head does not descend forcibly against the lower uterine segment, and hence not against the pelvic brim, until after the first stage is considerably advanced. Another exception is found in those cases where pelvic deformity prevents a nice adaptation of fœtal head to maternal parts. But in general we find upon rupture of the membranes during a pain, that the bag of waters, or rather that part of it within reach, empties itself, yet much of the amniotic fluid is left confined above the fœtal head, and escapes in part by a continuous drain during the intervals of contraction, in part at the beginning of subsequent pains, but more especially after fœtal expulsion. Resistance being withdrawn, the presenting part pushes down, and, "at the height of the contraction," as Cazeaux says, "the flow is arrested because the direct application of the head against the orifice stops it completely." "After rupture," says Lusk, also, "which usually occurs spontaneously, the water in front of the child's head escapes, though the greater part of the amniotic fluid is retained within the uterus by the valve-like pressure of the presenting part." We insist that these facts be borne in mind, and with them before us we will consider the theories of cervical dilatation usually advanced.

"During the contraction," says Playfair, "the bag of membranes will be felt to bulge, to become tense from the downward pressure of the liquor amnii within it, and to protrude through the os if it be sufficiently open. The membranes with the contained liquor amnii, thus form a fluid wedge, which has a most important influence in dilating the os uteri. This does not, however, form the sole mechanism by which the os uteri is dilated, for it is also acted upon by the contractions of the muscular fibers of the uterus which tend to pull it open. It is probable that the muscular dilatation of the os is effected chiefly by the longitudinal fibers, which, as they shorten, act upon the os uteri, the part where there is least resistance." It is the fluid-wedge action of the bag of waters to which has been

attributed such potency; and, so far as it is related to early dilatation, we would not raise a dissenting voice. But after the os has attained a diameter of, say, two inches, the tumefied scalp and presenting occiput advantageously substitute it. A part of the liquor amnii having escaped, and a fair opening of the os having been secured, the uterus is enabled to act with force on the fœtus, much as the fingers and thumb of the surgeon would on the glans penis in retracting the foreskin for relief of phimosis. It will be understood that we do not reject the theory of hydrostatic aid in dilatation; but we do claim that experience and reflection have led to the conviction that it performs a very unimportant part in the latter half of the process.

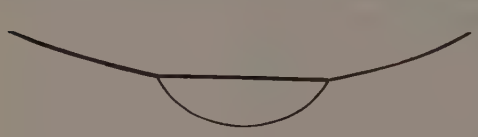


FIG. 128.

It will then be asked, "Why are labors complicated by early rupture of the membranes more protracted and dangerous than others?" We reply that observers mistake in classing together all cases wherein rupture of the membranes takes place at any and every period before and during dilatation; whereas a marked distinction ought to be made. When rupture takes place spontaneously before the first stage comes to a close, it most frequently occurs before the os has dilated to any extent, and while the woman is about the house or room, so that all, or nearly all, the amniotic fluid escapes, and the conditions thus become quite different from those now being discussed. We often rupture the bag of waters after a certain amount of dilatation has been accomplished and have but a small amniotic gush, and yet the effect on labor is salutary. We are fully convinced that beneficial effects as often follow when there is not a redundancy of liquor amnii, as when there is. If dilatation goes on till the expansion acquires a diameter of about two inches before the bag of waters discharges, the delivery cannot be set down as a "dry birth," and it is not thereby rendered more difficult and dangerous, but, on the whole, less so.



FIG. 129.

Dilatation of the os uteri is in the main dependent on other

causes than hydrostatic pressure. "The process of dilatation of the os is dependent," we are told by Meadows, "according to the late Dr. Rugby, not merely on mechanical stretching which the pressure of the membranes and the presenting part exert upon it, but also to the circular fibers being no longer able to maintain the state of contraction which they had preserved during pregnancy; they are overpowered by the longitudinal fibers of the uterus, which, by their contractions, pull open the os uteri in every direction." Cazeaux follows Desormeaux in attributing dilatation of the os largely to action of the longitudinal fibers. Tyler Smith regarded the os as possessed of both "dilatile and contractile" powers. He did not subscribe to the doctrine of equable and regular action of all parts of the uterus; nor did he regard contraction of the body and fundus of the organ as any more capable of overpowering the circular fibers of the cervix, than are the respiratory muscles of forcing open the little glottis in case of spasmodic closure. Moreover, he assumed that the individual muscular fibers of the cervix do not continuously surround the part, for if they did they would be so stretched during passage of the fœtus that they could never regain their contractility. He believed in a peculiar arrangement of the muscular fibers, by virtue of which something more than a sphincter is formed, attributing to the cervix dilative powers. Though questioned by many, this dual action of the os cannot positively be denied. Indeed, from the spasmodic expansion of the unimpregnated os witnessed by Mundé, and several others, during sexual orgasm, the part seems almost unquestionably to possess spontaneous dilative as well as contractive energy.

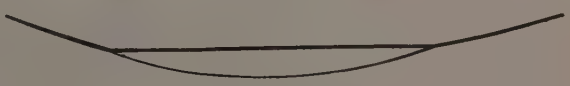


FIG. 130.

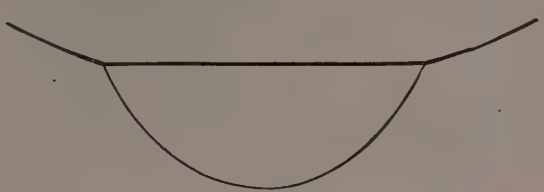


FIG. 131.

The three main factors concerned in dilatation of the part we would then set down as, (1) mechanical action, primarily, of the bag of waters, and, secondarily, and more energetically, of the fœtal cranium or other presenting part; (2) contraction

of the longitudinal fibers of the womb; and (3) spontaneous expansive action of certain muscular fibers, not yet demonstrated, residing in or near the cervix.

With respect to the first, it may be said that the bag of waters, in the early part of the first stage of labor, plays a very useful role by insinuating itself into the os, as shown in figure 128, and gradually spreading it, much as would a rubber dilator as applied by the gynæcologist. But long before expansion is complete this action loses its best effect (see figures 129 and 130),



FIG. 132.—Section showing the Fœtus, inclosed in its membranes, with expanding Os Uteri.

and may be advantageously substituted by the scalp and cranium of the child, as suggestively shown in figure 133.

Concerning the second, little need be said, since all admit the powerful effect of the strong longitudinal muscles of the uterus. The organ being thicker, and the muscular fibers more numerous, in the body, the weaker part is compelled gradually to yield, and thus, by degrees, expansion of the os is carried forward.

Spasmodic contraction of even weak muscular fibers is hard to overcome and this sometimes seems especially true of

that involving the cervix uteri; but, in a given case, when once it is broken, there may be not only cheerful acquiescence on the part of the muscular fibers involved, but efficient aid afforded by them or their congeners.

Rupture of the Membranes.—After wide expansion of the os uteri and the way is open for fœtal descent, pressure becomes so strong as usually to cause spontaneous rupture of the membranes. When unusually tough, they may, in neglected cases, continue unbroken, and envelop the fœtus to the very close of the second stage. This can occur only when the placenta is dragged loose from its moorings, and is also extruded. A child thus enveloped is said to be born with a "caul." What is even more common, however, is a rupture of the membranes at the point where they surround the neck, and retention of the detached portion over the face, constituting a "veil," which old nurses regard as a sign of good luck.

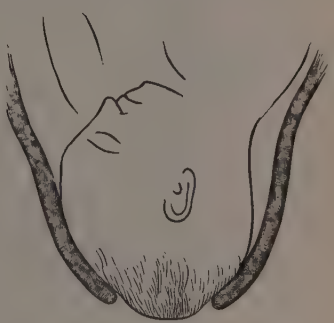


FIG. 133.

THE SECOND, OR PROPULSIVE, STAGE.—At this stage the os is completely dilated, and somewhat retracted, so as scarcely to be felt. The uterus contracts more closely on the fœtus and pushes it downwards into the pelvic cavity. When it reaches this situation the woman begins to feel the presence of a solid body which must be expelled, and she accordingly bends every endeavor to the accomplishment of the undertaking. The pains assume a different character. They are really much more painful, but the consciousness that they are accomplishing something seems to infuse both strength and courage. The powerful propulsive efforts made by the woman are termed "bearing down," "propulsive," or "expulsive," hence the name, "propulsive stage," often given to this part of labor. The resistance encountered in the first stage having been removed by the completion of dilatation, the pelvic brim, the varied relative diameters of the pelvic cavity, the pelvic floor, vagina and vulva, in turn resist rapid progress. When the pains are powerful, and resistance is great, tumefaction of the fœtal scalp is likely to ensue at the point of least resistance, resulting in a swelling known as the "*caput succedaneum.*"

The recurring contractions cause the head to descend lower and lower, until it comes to press against and distend the perineum. The part advances during a pain, and recedes as the pain passes off, making a sensible gain each time. This to-and-fro movement is a wise provision of nature to prevent continuous pressure over any one pelvic area, as well as to obviate too rapid

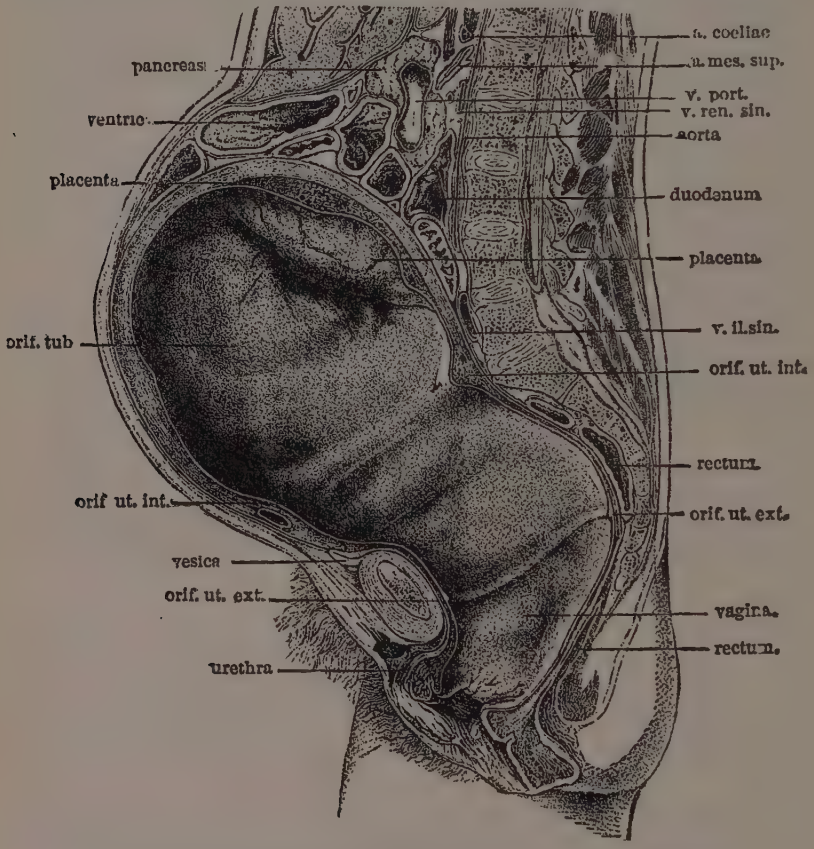


FIG. 134.—The Uterus and Parturient Canal. (Fœtus removed.)

distension of the soft structures. The rectum becomes flattened and its contents expelled by the advancing head. Pressure on the pelvic floor, and subsequent distension of the vulva, open the anus to a considerable extent, and thin and elongate the perineum. As the fœtal head enters the pelvic brim, with the occipital pole of its long diameter in advance, a condition of firm flexion of the chin on the sternum is enforced.

With the long diameter of the head lying in an oblique diameter of the pelvis, a movement in the pelvic cavity is necessitated, by means of which the long diameter of the vertex is brought into the conjugate of the outlet. This movement is termed rotation, and the time for its accomplishment is when the head presses firmly against the pelvic floor, and the perineum is thereby made to bulge The vulvar opening is put more and more on the stretch as the head emerges; the woman gathers her energies for every pain and presses as forcibly as her strength will allow; while now and then she gives vent to her terrible sufferings in an agonizing cry. The straining efforts of the woman are in a measure under her control. They are intensified by in-

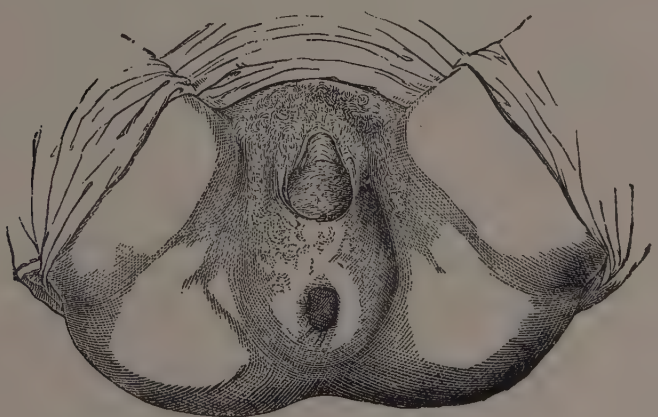


FIG. 135.—Distension of the Perineum. (Hunter.)

flation of her lungs and forcible retention of her breath while she exerts them; while, on the other hand, by opening the mouth and giving expression to her feelings in cries, the abdominal muscles are relaxed, and the straining efforts modified. The head finally passes the vulva, and the woman experiences a sense of great relief, which is destined soon to be disturbed by a pain that brings the fœtal body wholly into the world. Expulsion of the fœtus is followed by an outpouring of the amniotic fluid, which is commonly reddened by blood from the vessels lacerated by decidual release and partial or complete separation of the placenta. The pains then cease, and the relief experienced by the woman is most delicious. It is the succeeding Heaven, the calm after the storm, the stillness after the upheaval, the rest after a wearying warfare with a relent-

less opponent; and but for it labor would be absolutely unendurable.

The duration of the second stage is exceedingly variable, being largely dependent on the frequency and force of the pains, the form of the maternal pelvis, the condition of the soft structures and the size of the fœtus. This stage of labor is occasionally completed in twenty or thirty minutes, though in many cases it lasts several hours, and but for interference would sometimes be prolonged indefinitely.

Movements of the Pelvic Articulations.—There is a popular notion among people of nearly all nations, and has been from time out of mind, that, during labor, there is extensive movement and separation of the pelvic bones. Many capable of forming an intelligent opinion on the subject, have cast much doubt on the claim that movement takes place at an articulation other than the sacro-coccygeal. The consensus of opinion, among the best authorities, appears to be that slight movement of the sort in question, does sometimes, if not uniformly, take place. At the symphysis pubis the ligaments are softened, and, under pressure, there is a little separation. At the sacro-iliac synchondroses similar relaxation of ligamentous structures occurs, the articular surfaces are sundered to a minute degree, and then there is performed an oscillation of the sacrum on its transverse axis. The sacro-sciatic ligaments share in the general relaxation, and thereby give greater freedom to the action. Zaglas was the first to call attention to the movement at the sacro-iliac articulation in other than parturient conditions. He found, for example, that in defecation, the oscillation amounted to about a line. Dr. Matthews Duncan describes a similar, but exaggerated, movement as taking place in the parturient woman, and indicates the advantages thereby afforded, and the conditions which favor it. Thus at the beginning of labor, as the head enters the brim, the woman instinctively prefers to sit, to walk, or, if to lie, to do so with the lower limbs extended, positions which favor the rotation backwards of the sacral base, and consequent increase of the conjugate diameter of the brim.

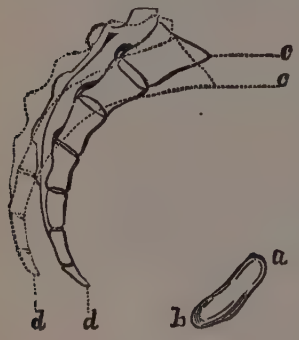


FIG. 136.

How often, in the early stage of labor, do we see the patient sit, during a pain, with her hands on her hips, and the shoulders thrown backwards.

But when the head reaches the pelvic floor, and begins to engage the outlet, there is a manifest disposition of the woman to bend the body forwards, and flex the thighs,—conditions which favor extension of the conjugate diameter of the inferior strait by rotation of the sacrum on its transverse axis.

THE THIRD STAGE.—The second stage merges into the third with full birth of the fœtus; and occasionally the third stage is terminated by the same contraction which ends the second. In general, the third stage is not brought to so speedy a close, but pursues a course marked by its own special phenomena. During this part of labor the intimate vascular relations between mother and child are interrupted, and by orderly action of the natural forces the necessary changes are safely wrought.

This stage of labor has its own peculiar dangers, which frown upon the woman more ominously than those of any other. It is sometimes ushered in by syncopal sensations, arising from recession of blood from the brain, occasioned partly by sudden withdrawal of intra-abdominal pressure, partly from blood-loss, but more especially, we believe, from general shock. This is usually short-lived, and the pulse becomes firm and slow, showing high arterial tension. As reaction begins, the patient often experiences a chill, or, more properly speaking, a marked nervous tremor, the shaking being out of all proportion to the chilliness. This need cause no apprehension, since it proceeds from mere vaso-motor disturbance which speedily rights itself. A certain amount of blood-loss is characteristic of this stage, and may be regarded as salutary. In a plethoric woman it may be quite profuse without harm, while in another half the quantity would be a misfortune. In setting the normal bounds we are then carefully to consider the varying states of our patients.

After the second stage, there is usually an interval of repose, of varying duration, before the uterus resumes its activity. This is succeeded by contractions of sufficient force to detach and expel the secundines. In unassisted cases the placenta may be expelled into the vagina, and there remain for an indefinite period. The contracting uterus follows the fœtus during expulsion, and after extrusion of the afterbirth, condenses into a firm mass in the hypogastrium. Detachment of the placenta

takes place in the meshy, lamillated layer, which is formed in the serotina by the thinned, elongated walls of the gland tubules, the dense layer which forms the maternal portion remaining adherent to the placenta.

Much emphasis has of late been put upon the mechanism of placental expulsion as elucidated by Dr. Matthews Duncan and others. It is held by them,—and their views are now generally accepted,—that when no traction is put upon the umbilical cord, the placenta issues from the uterus edgewise, though it may be folded longitudinally; but when it is drawn out by

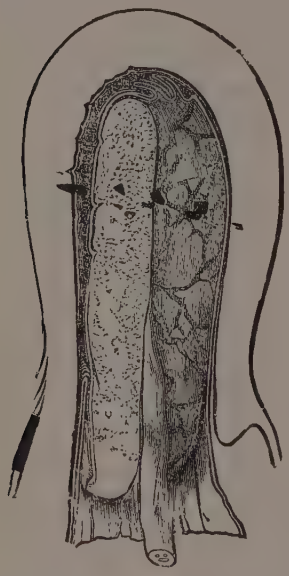


FIG. 137.—Normal mode of Separation and Expulsion of the Placenta.

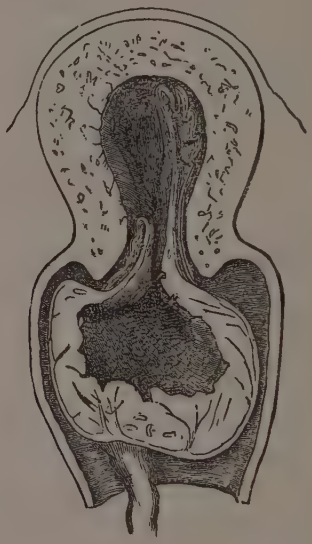


FIG. 138.—Mode of Separation and Expulsion when traction is made on the Cord.

traction on the cord, inversion occurs, and, from the suction action thus imparted, the difficulties of delivery and the dangers of hemorrhage are augmented.

Gassner found that after confinement, the female experiences, as a consequence of uterine evacuation, of exhalations from the lungs and skin, from the discharge of excrements, from loss of blood, and from other depletions, a loss of weight equivalent to one-ninth that of the entire body.

Duration of Labor.—Labor differs so greatly in duration that it is almost impossible to deduce from observation any

important facts concerning its length. It may be said, however, that, in general, it is longer in primiparæ than in multiparæ, on account of the greater firmness of the soft structures. It is also observed that, other things being equal, the pains and difficulties of first parturition increase with age. The relative depth of the pelvic cavity has a modifying influence upon labor, and accordingly it is found that very tall women pass through the ordeal with less facility than others. It is also true that short, stout women, with considerable adipose tissue, suffer long labors, owing to the firmness of their tissues, and the presence of an unusual quantity of fat in the pelvic cavity. The character of labor is subject to modification by the position and presentation of the fœtus. Presentation of the face, for example, is attended with greater difficulty than that of the vertex, and an occipito-posterior position is more unfavorable than an occipito-anterior. Other modifying conditions are often found to exist, as the presence of tumors, contraction of the pelvic diameters, unusual size of the fœtal head, etc.

People are prone to think that it is within the power of the physician of skill and learning, to foretell the exact duration of labor, a thing, by the way, which he is not capable of doing. The pains may be vigorous, the tissues relaxed, and everything progressing in a satisfactory way, when the uterine contractions may suddenly weaken, or utterly cease for many hours, or some other unfortunate occurrence interpose to interrupt the regular course of nature.

The relative duration of the first and second stages is by some stated to be in the proportion of two or three to one, but others estimate it to be nearer four or five to one. In properly managed cases, the second stage is never longer than the first.

The Hour of Labor.—The larger number of births is said to take place in the early morning hours. West observed that out of 2019 deliveries, 780 occurred between 11 P.M. and 7 A.M.; 662 from 7 A.M. to 3 P.M. and 577 from 3 P.M. to 11 P.M. Kleinwachter tells us that labor-pains usually set in between 10 and 12 P.M. Spiegelberg believes the maximum frequency of birth is between 12 and 3 o'clock.

Lunar Influence on Parturition.—Dr. C. G. Raue in 1865 called attention to this subject, and reported his observations in thirty-four cases, in which, with a single exception, he found that birth took place at high tide. Dr. T. S. Hoyne found in seventy-five cases but four exceptions.

Dr. M. M. Walker prepared a paper on the subject for the Hom. Med. Society of Penn. (Sept. 1882), with a report of two hundred cases, from which the following figures have been taken:

Number born during solar and lunar flood tides combined,	42
" " " solar flood,	52
" " " lunar flood,	38
Total born during the flood tides,	132, or 66 per cent.
" " " " ebb tides, and at other times,	42, or 21 per cent.
Instrumental cases and extractions,	26, or 13 per cent.

Three cases born during the administration of an anesthetic, without instrumental aid, and included in the above table, occurred as follows: one during both solar and lunar flood, one during lunar flood, and one during ebb tide. These two hundred consecutive cases occurred from Nov. 1874 to Aug. 1881.

CHAPTER III.

THE MANAGEMENT OF NORMAL LABOR.

Having given a brief account of the phenomena usually observed in labor of a normal character, it becomes necessary to offer some observations on the management of the various stages of the parturient process. So wisely has nature adapted means to ends, that the act throughout is generally one which requires but little direction, and still less assistance, from the medical attendant. So true is this that we might add that, in the larger number of cases, as happy and satisfactory an issue results under the care of an uneducated, but experienced, attendant, as under the conduct of those highly learned, and consummately skilled. But irregularities in the parturient act are liable to arise, in the management of which mere experience will not avail. To meet and successfully manage complications as they arise, the accoucheur must have a thorough acquaintance with the phenomena of the normal process which have already been described, and be otherwise well grounded on obstetric principles.

PRELIMINARY ARRANGEMENTS.—Within the scope of these suggestions regarding the management of labor, should be included mention of certain preliminaries, respecting which women often require some advice. In their proper place, observations respecting exercise and care of the bowels have been made, but we ought here to add that the woman should give especial attention to the observance of these. In no case should the customary stool be neglected when labor is at hand, and if there is the slightest tendency to constipation, as soon as pains are experienced a large enema should be taken and the bowels emptied, which will facilitate fœtal expulsion, and at the same time render the necessary attentions of the accoucheur less disagreeable.

Under the same head, we may call the physician's attention to the advisability of ever holding himself in readiness to attend midwifery cases, in order that no unnecessary delay may ensue. It is true that in the majority of instances there is no occasion for haste, but in many cases successful results are dependent mainly on the physician's promptitude in responding to the urgent call.

PROMPT RESPONSE TO CALLS.—The practitioner will often be

subjected to the annoyance of being called before labor has actually begun, but this fact should make him none the less attentive and prompt. It is of the highest importance that abnormalities of fœtal form, presentation, and position, and unfavorable maternal conditions, be recognized at the earliest possible moment, since this places the accoucheur in a position leisurely to determine upon a plan of treatment, to provide himself with the best facilities, and to choose the most desirable moment for interference.

ARMAMENTARIUM.—If the case to which he is called is likely to be difficult, the forceps and the perforator may be carried. Indeed, if the call is to take him a considerable distance from home, it is the part of prudence to take along such instruments as may be required in emergencies. The physician in active obstetrical practice will do well to provide himself with a bag or case of obstetrical instruments, which should include a good pair of *long forceps*, a perforator, a pair of craniotomy-forceps, a crotchet, a right-angled blunt hook, a decapitating hook, two or three vulvar retractors, four pairs of bullet forceps with catches, full-curved suture needles of various sizes, a needle-holder, catgut, silk, iodoform gauze, and a new soft rubber catheter. Besides these he should have a pocket-case of instruments, a hypodermic syringe, and a quantity of chloroform. He should provide himself also with a case containing, in addition to the most common homeopathic remedies, a reliable preparation of fluid extract of ergot.

HOW TO APPROACH THE PATIENT.—There is no subject connected with midwifery practice, instruction concerning which would be more acceptable than this, and yet it is one upon which very little satisfactory instruction can be given. The fact is, that the etiquette of the lying-in chamber is founded upon the same general principles of deportment which govern the polite relations of life. Gentlemanly demeanor is about all that is required to insure mutually agreeable contact. Still, the caprices of women during labor are greatly augmented in number and volume, and the most considerate conduct on the part of the physician will sometimes be met with repulse.

Women in parturition watch every movement, and mark every word of their medical attendant, so that his tact then, as perhaps at no other time, is put to a crucial test. Nor can their likes and dislikes, their opinions and their whims, be put into one general class and treated alike. Here, as elsewhere, to in-

sure the best results one must individualize, and he who does so best, will achieve the most perfect results.

The following advice, given by the erudite and urbane Dr. Blundell, is thoroughly practical and sensible: "If you are well known to your patient," he says, "on reaching the house you will be welcome to her apartment; but if you have not frequently seen her before, nor attended her on former occasions, I would recommend you not immediately to pass into her chamber. Not having her full confidence, by your presence you might agitate her, and in these cases it is proper to avoid everything that may produce commotion of the nervous system. It is better, therefore, that the accoucheur retire into some adjoining room, where he may see his lady patroness, the nurse, who has generally a great many foolish things to say, all of which he may as well hear with patience and bonhomie. When the shower of words is blown over, or when Mrs. Speaker reluctantly pauses to draw breath, dexterously seizing the auspicious moment, you may make inquiries respecting the progress of the labor, the condition of the bladder, the state of the bowels, and so on; questions which, in ordinary cases, may with more delicacy be proposed to the nurse than to the patient herself. Should you chance not to be a dear man, a pious man, a good kind creature, or, still worse, should the lady be pettish, and declare you to be a brute or a physiologist, so that for these manifold offenses she never, never will—never can see you—you may remain in the house, as the female '*never*' in these cases comprises but a small portion of eternity, perhaps on an average, some one or two hours, and when caprices and antipathies are a little subdued by the pains, your presence will be cordially welcome. Now, then, the pains being severe, after you have entered the room, you may make your examination, and if you find the labor rapidly advancing, you must remain at the bedside lest the child should come into the world in your absence."

THE EXAMINATION.—When shall it be made? The stage of advancement which appears to have been reached, is the most determinate element. When the physician reaches his patient she may be experiencing the very first dilating pains, or she may already have progressed into the second or propulsive part of labor. In the latter instance, an examination cannot be made too soon, while in the former, there would be no occasion for haste. Unluckily, the existence of these various con-

ditions cannot in every case be determined. It is possible, as a rule, to distinguish between the first and second stages of labor by external signs, as, for example, the peculiar pains of each; but it does not follow that there is no urgency for an examination because the os is not supposed to be wide open, nor that there is an inexorable and immediate demand for it because real propulsion has begun. The best counsel is, not to be so precipitate in necessary investigations as to shock the patient, or betray trepidation; and on the contrary, not to permit undue caution or constraint to carry one to the opposite extreme; but to act deliberately and discriminately, keeping in mind the desirability of recognizing the important features of every case through a thorough vaginal examination, as early in labor as practicable.

The finger is generally recommended to be introduced during a pain; but it is far preferable to do so in the interval between pains, and to continue the examination during a contraction.

The patient need not be restricted to any one position for the purpose of examination. Women are extremely restless during labor, and in frequent changes seek relief. They assume all sorts of postures, and resort to all kinds of expedients, and one must deal in an accommodating way. Let the woman remain undisturbed by any considerable change, and she will evince less aversion to the necessary touch. The allusion is now to cases as they are ordinarily met. When for operative purposes, an absolute diagnosis of the exact presentation and position, and the condition of the parturient canal in obscure cases, becomes essential, the position most favorable for differential distinctions should be prescribed. This is generally upon the back, near the edge of the bed, so as to permit the use, with equal facility, of either hand. Sometimes the os uteri and presenting part are more easily reached when the decubitus is lateral.

Cursory examinations are of little value. In the practice of obstetrics, as well as in all other affairs, "what is worth doing at all, is worth doing well." None of us possess supernatural powers, and therefore ought not to assume celestial airs. It takes time to make a thorough exploration.

Nothing is more annoying to a woman of delicate sense than a bungling attempt to pass the finger. A hint worth remembering is that the vaginal orifice lies but slightly in front of a line from one ischial tuberosity to the other. Whether the

woman lie on her side, or on her back, the hand may be passed in a careless manner against the tuber to locate it, and thus ensure proper direction to the fingers.

The points to be observed in a careful examination are the conditions of the vulva, bladder, rectum and vagina; the size and relative state of the os and cervix uteri; the general location of the presenting part, its character and position; the condition of the fœtal membranes, and the general capacity of the pelvis, at the brim, in the cavity, and at the outlet.

Frequent examinations should be avoided, as they tend to irritate the vulva, and cause the woman, if sensitive, unnecessary suffering. Yet, no matter how painful they may be, they should be made often enough to acquaint the physician with the progress being made. A single finger may answer, but two fingers, should, as a rule, be employed. In every instance they should be smeared with some bland lubricant before introduction.

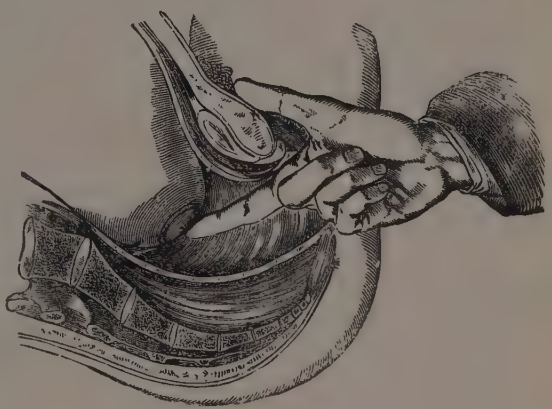


FIG. 139.—The Vaginal Touch.

EXTERNAL EXAMINATION.—Examination of the abdomen by palpation should not be omitted, and if there be a serious doubt concerning the presentation, the existence of single pregnancy, or the presence of fœtal life, auscultation should be practiced. A superficial manual examination of the abdomen, rapidly made under the clothes, is a common practice; but it is advisable to go further and make a systematic, scientific and accurate manipulation, by which we may ascertain the existence of pregnancy, the fœtal position, presentation, approximate size and general condition, and the relations of the uterus. Concurring heartily in what Holst says on the subject of bimanual examinations, that "a detailed discussion of this method of examination is necessary to the completeness of a text-book," we have elsewhere considered the subject at some length.

HAS LABOR BEGUN?—As a rule, when the physician is called, there is no doubt that labor has begun. Often he is not summoned till the middle of the process, and upon examination finds the os uteri open, the liquor amnii discharged, and the head of the fœtus approximating the outlet. In other cases, however, the presence of what have been described as false labor-pains, leads the woman to believe that parturition has made some progress, when in reality it has not begun. Careful attention to a few clinical hints will confer the knowledge and acumen necessary to differentiate the real signs of labor. With the finger in the vagina during a pain, observe whether there is any descent of the presenting part, or distension of the bag of waters, or other symptoms of forcible uterine contractions. Observe further, as the pains come and go, whether there is progressive uterine dilatation. Mere openness of the os uteri is not conclusive evidence. There is a difference between real dilatation of the os, such as comes from incipient labor, and an open state of the part. For weeks prior to delivery there is sometimes expansion to the size of a quarter of a dollar, or even more. An increasing expansion of the os uteri denotes the existence of real parturition. The three decisive indications of labor are, then, (1) advance and retreat of the presenting part; (2) tension and relaxation of the membranes; and (3) above all, progressive expansion of the os uteri.

Other, less decisive, indications of labor are an open and relaxed state of the vulva, accompanied with a more or less free flow of mucus, or mucus and blood, and rhythmical pains returning every ten, fifteen, twenty or thirty minutes.

FALSE LABOR-PAINS.—Women, as they approach the close of utero-gestation, often suffer with pains which simulate, in a measure, those of labor. Believing that real travail has begun, they summon the physician to their bedside, to whose annoyance an investigation develops no substantial evidence of incipient parturition. "False alarms" of this kind are by no means infrequent, and are sometimes repeated by the same woman.

The Symptoms of false labor-pains vary to correspond with the causes whereon they depend. The pain is often located in the umbilical region, and is clearly referable to the enlarged uterus. The ovarian region is sometimes its seat, and again it is felt in the hypogastrium, in which case it most closely simulates the pains of real labor. Finally, it is occasionally felt

most severely in the lumbo-sacral articulation, and extends downwards into the thighs.

False labor-pains are, as a rule, continuous, but may present exacerbations. In some instances they are intermittent, but irregular in recurrence, while occasionally they come and go with the rhythmus of true pains.

Causes.—Spurious labor-pains owe their origin to a variety of causes. Undue distension of the uterus and abdomen can be set down as one of them. This may operate in a two-fold manner. 1. The very distension may create a bearing, tensive feeling in the pelvic region, especially in the latter half of the ninth month, when there is usually more or less subsidence of the organ; 2. The normal contractions of the uterus which regularly recur throughout the greater part of pregnancy, may become painful as a result of the great tissue-strain which exists.

Apart from unusual distension, there is, in the few days which precede labor, great pressure downwards of the gravid organ, which is capable of creating not only vesical and rectal irritation, but a certain amount of real pain.

Women of delicate organization, and those whose strength has been impaired by disease, are liable to suffer from neuralgia affecting the pelvic and abdominal viscera. Pains of this character are often intense, and sometimes observe a degree of regularity in recurrence.

In some cases, what are termed false labor-pains may be due to rheumatism, though probably it is not a common cause. The uterus being rendered exquisitely sensitive by its rheumatic or rheumatoid state, cannot painlessly undergo the distension, the pressure, and the slight contraction, to which it is physiologically subject.

Very likely false labor-pains are frequently excited by reflex causes. Irritation exists at some point,—commonly the stomach or bowels,—and is reflected to the uterine region, giving rise to suffering resembling that of incipient parturition.

Diagnosis.—The physician ought to be able to discriminate with exactitude between the genuine and the spurious, as he may thereby protect his professional credit, and save his patient an unnecessary amount of distress. Reputable and generally competent physicians, have been victims of error in such cases. A correct diagnosis is not always made with facility.

Single symptoms are not decisive: a sound opinion must rest on the totality of signs.

Perspicuity in differentiation between spurious and genuine labor-pains is best attainable by a close comparison like that which follows:

TRUE.	FALSE.
1. Most frequently felt in lumbo-sacral and hypogastric regions.	1. Sometimes felt in lumbo-sacral and hypogastric regions; occasionally in inguinal, but oftenest in umbilical region.
2. Pains rarely constant	2. Pains often constant, sometimes remittent, but rarely intermittent.
3. Pains always recur with regularity.	3. Pains generally irregular.
4. Pains quite uniform in duration.	4. Pains generally very unequal in duration.
5. Pains at first far apart, and feeble, gradually becoming more frequent and severe.	5. Pains continuous, remittent, or intermittent with short intervals, their intensity observing no regular increase.
6. Pains generally preceded or accompanied by a mucous, or muco-sanguinolent discharge from the vagina.	6. Pains occasionally accompanied by a mucous discharge from the vagina.
7. The internal os is found to have yielded partially, or fully, and the cervical body to have disappeared.	7. The internal os sometimes found closed, and the cervix distinct.
8. The uterus during a pain contracts with force, and the membranes bulge.	8. There may be uterine contraction, but it is not forcible, and the membranes, if they can be felt, are but slightly, or not at all, affected.
9. The os uteri is found to be dilating.	9. The os is not dilating, though occasionally it is somewhat patulous.

Treatment.—If the pains are severe, the woman ought to be placed in the recumbent posture, in a quiet room, and every annoyance attentively removed. Search may then be made to ascertain if the pain is not reflected from some distant point, and if such a cause is found, it must, if possible, be removed.

Local treatment will afford much relief, especially in rheumatic and neuralgic cases. *Hamamelis* or warm spirits may be freely applied to the abdomen. Unctuous applications will greatly relieve the feeling of over-distension, and consequent suffering.

When the pains observe a decided periodicity, like those of labor, *caulophyllum* in a low potency is very effectual in many

cases. Some physicians regard it as a real specific. When there is spasmodic pain, or when the woman suffers in the ovarian region, especially at night, and is restless and uneasy, *pulsatilla* should be given. *Actæa racemosa* is peculiarly serviceable in rheumatic or rheumatoid conditions. *Belladonna*, and its active principle *atropia*, are especially suited to the pains when of a neuralgic character. *Nux moschata:* spasmodic, irregular pains; the patient has drowsy, faint spells. *Nux vomica* may be required when the pains seem to depend on gastric irritation. *Arsenicum album:* when there is gastric irritation and thirst; the pains are sharp and distressing.

THE PATIENT'S BED AND DRESS.—These are matters with which the physician generally has little to do, as they properly belong to the nurse or other female attendants. It is wise, however, for the physician to be prepared to supervise them, when, in emergencies, he is appealed to. The bed should not be very soft;—the best is a good hair mattress upon a tick filled with straw or husks. A soft rubber or oil cloth should be laid over the mattress, and a sheet spread upon it. A folded sheet, or a wood-wool pad, should also be placed under the woman's hips, and another sheet should be pinned about the hips, the chemise and nightdress having been rolled up, for protection. During labor the amount of covering may be regulated to suit the patient's wishes, unnecessary exposure being avoided.

The lying-in chamber should be as large and airy as the house affords, and provided with good facilities for heating if the labor occur in a cool season.

POSITION OF THE WOMAN.—If the room is warm, there is no valid objection to the patient walking or sitting as her inclination may suggest, in the early part of labor; but this should not be permitted after the second stage is fairly inaugurated. She ought then to be confined to her bed. When the presenting part has descended low into the pelvic cavity, and the pains are strong, on no account should she be permitted to rise. The compression exerted by the head, or other presenting part, may create a tenesmus of both bladder and rectum, and frantic requests be made for the privilege of using the chamber-vessel. This, however, should not be permitted, for fear of a sudden termination of the expulsive act while the woman occupies an attitude unsuitable for proper protection of mother and child.

THE PHYSICIAN'S ATTENDANCE DURING THE FIRST STAGE.—During the first stage of labor the physician ought not to be in

constant and close attendance, as such attention would raise too high the woman's expectations of speedy delivery. The physician himself will find frequent, and somewhat prolonged, absence from the room a grateful relief from the oft-repeated query of both the patient and her friends regarding the duration of labor. To give non-committal, and yet satisfactory answers, is no easy task. His absence, too, will give the woman time and opportunity to use the chamber-vessel, or visit the closet, a thing which she should be encouraged often to do during this stage. If at any time there should be evidence of much urinary accumulation, with inability to empty the bladder in a natural way, the catheter ought to be employed.

BEARING DOWN.—Women are generally encouraged by the nurse, and other bystanders, to bear down with force whenever a pain returns; but in the first stage of labor this should be utterly discouraged. The practice is not only useless, but harmful. In the second stage only can much aid be derived from abdominal efforts, and earlier exertion tends needlessly to exhaust the patient's strength.

TREATMENT OF THE MEMBRANES.—Upon making a vaginal examination after labor has fairly begun, there is often, but not always, to be felt protruding into the os uteri during a pain, a tense disk of membranes termed the *bag of waters,* or the *bag of membranes.* It is the practice of some to break this bag, and allow the liquor amnii to escape, early in labor, under the belief that progress is thereby accelerated; but the most approved treatment is to refrain from so doing until full dilatation of the os has been accomplished. The latter conduct is generally recommended on the theory that the bag of waters, by the hydrostatic force which it exerts, aids very materially in the process of dilatation. It is found, however, that, in a large percentage of cases, there is no distinct bag of waters at the os uteri, and yet dilatation proceeds in just as satisfactory a manner. Again, in certain cases wherein the phenomena of the first stage are slowly and tediously manifested, rupture of the membranes will often greatly accelerate the natural processes. Still, we will probably do well to adhere, as a practice, to the old rule, and refrain from rupturing the membranes until the stage of uterine dilatation has been completed. The bag of waters can be ruptured more easily during a pain, at which time the membranes become tense; and if it cannot be effected with the finger, a probe, or a stiff catheter should be carefully used.

THE SECOND STAGE.—Thus far we have treated mainly of the duties of the accoucheur during the first stage of labor. But with complete dilatation of the os uteri the first stage closes, and is succeeded by the second, or propulsive, stage. The precise moment of complete dilatation is not always easily recognized. Indeed, there appears to be some dissonance of opinion with reference to what constitutes full dilatation. We are left to infer from most descriptions that complete expansion is not accomplished until the os has passed out of reach of the examining finger. What we have to say here with reference to the management of the second stage of labor is fully applicable, however, to a period which somewhat precedes entire retraction of the os uteri. For practical purposes, then, we may regard the first stage of labor fairly closed when the os is widely expanded, and the presenting part, proper, and not alone the caput succedaneum, protrudes, during a pain, to a certain extent, through the os uteri.

ENCOURAGE BEARING EFFORTS.—The phenomena of the second stage are distinct and peculiar. The woman is now disposed to bring into action her abdominal muscles, and with each severe pain to make a strong bearing effort. This action, unless vehement beyond measure, ought to be encouraged, and every facility afforded for its proper direction and utilization. While she occupies the dorsal position, the physician may sit beside the bed, or upon it, and hold one hand of his patient, while someone on the opposite side holds the other. The feet may be braced against the foot-board directly, or through the intervention of a stool, box, or chair; or, what will answer as well, the woman's knees may press against the shoulders of her assistants. Now, by encouraging her to close her mouth, to hold her breath, and to pull and bear down, very effective work may be done. When the patient lies on her side, both hands may be held by an assistant, while the knees rest against the latter's body for a fixed support. Such counter-traction requires the services of a strong person. Between pains the woman should be permitted to take perfect rest. If descent proceeds rapidly, the fingers of the accoucheur should be kept within the vagina, and the case carefully watched; but if slow progress is made, an occasional examination only, is, for a time, required.

The pains of the second stage are in some respects more satisfactory to the patient, than those of the first stage, inasmuch

as they appear to be more effective; but the real suffering experienced in this part of labor is far more intense. The woman becomes restless and impatient, and makes frequent inquiry as to how soon labor will terminate, at the same time declaring that she can endure the suffering no longer. Great tact is here required to maintain the patient's courage and confidence. The manifestation of the slightest perturbation by the physician is liable to create a panic among the patient and her friends. Few words, fitly chosen, spoken with evident composure, are far better than long explanations, or much talk on any pretext whatever.

THE USE OF ANESTHETICS.—The general subject of anesthesia during labor will elsewhere be discussed, but we may here take occasion to say that, in the latter part of the propulsive stage, when the pains become almost unbearable, there is no well-founded objection to be raised against the moderate use of chloroform. A few drops may be poured on a handkerchief, and when a pain is due, the woman may take a few inhalations, with the effect to somewhat benumb the sensibilities without producing narcotism. Such administration of a good article of chloroform is almost wholly devoid of danger, and may be continued for several hours, if needed. A little instruction given the nurse will enable her safely to use the anesthetic, to the extent mentioned. The severity of pain suffered by women in labor varies so considerably that chloroform should not be resorted to indiscriminately; but let it be given in those cases only wherein there is a strong demand for its soothing aid.

INDICATIONS FOR INTERFERENCE.—So long as there is progress being made, we should abstain from interference. If the pains slacken, or if delay of the head in the pelvic cavity arise from any other cause, we should not allow the duration of the second stage to exceed physiological limits. A satisfactory definition of what is implied by the phrase "physiological limits" cannot be easily given, since its boundaries are not fixed, and they require to be set in each individual case. It should be remembered that pressure of the head upon the soft tissues of the pelvic cavity, leads, when prolonged, to pathological changes in the tissues of the canal and outlet. It is a wise rule of practice not to permit the head of a relatively large child to remain stationary in the pelvic cavity for a period in excess of two hours. But before resorting to instrumental delivery, the aid of other means should be invoked.

Feeble pains are sometimes intensified by changing the woman's position, as from the back to the side, or *vice versa*. Firmer flexion of the fœtal head is sometimes thereby effected. When that part has descended to the perineum, expulsive action may be excited by kneading the abdomen, or by pressing upon the fundus uteri.

USE OF THE CATHETER.—There is sometimes considerable distension of the bladder during the second stage, accompanied with utter inability to urinate. This distressing condition must at once be removed by means of the catheter. The use of the instrument is sometimes attended with considerable difficulty, owing to pressure of the head against the neck of the bladder, and a change in the direction of the urethra, arising from excessive compression and partial prolapse of the anterior vaginal tissues. On these accounts the best instrument for use is the soft rubber catheter of medium size.

INCARCERATION OF THE ANTERIOR LIP OF THE OS UTERI.—As the head descends into the pelvis, the anterior lip of the os uteri is sometimes caught and held between the head and the pubis, and may thereby become a manifest impediment to the progress of labor. Unless there is excessive tumefaction of the part, interference is seldom required. Rigby declares all attempts to push it above the pelvic brim not only futile, but decidedly objectionable, since inflammation is liable to be set up. This dictum is not accepted by all. "Any attempt," says Leishman, "rudely or forcibly, to push up the anterior lip, even when it exists as a manifest impediment, should certainly be avoided; but we are bound to add that, in many cases, it may be pushed beyond the head with perfect safety, and in this way the impediment to delivery may be at once obviated." The attempt should be made in an interval between pains, and the part sustained until the recurrence of another contraction serves to maintain it in a situation above the limit of compression.

THE PREVENTION OF VULVAR LACERATION.—Owing to the form and direction of the parturient canal, following as it does an irregular curve, the structures in that part of the curve which is least in accord with the uterine axis, and hence farthest from the line of propulsive energy, receive the brunt of the force, and are compelled to make the chief resistance. The included angle of the two sides represented by the line of pelvic entrance and the vulvar plane upon which the fœtus finally emerges, is practically a right angle, and hence the pelvic floor

is obliged to meet the descending head and deflect it in the direction of least resistance, at the expense of considerable strain. It follows that the question of laceration of these structures is very largely determined by their strength and elasticity.

We do not need to make many examinations to learn that there is a vast difference between perinea. Some are large and thick and strong, while others are small and thin and weak. The former can resist a powerful strain, while the latter are capable of withstanding but little. Pass your finger during labor along the vaginal surface of the perineum and pinch that body between the thumb and finger.

In one case you find it thick and firm, but moderately long as measured from the vulva to the anus, and evidently able to bear, without breaking, all the power which is likely to be applied from above. Again you find a long, thin, moderately muscular structure, comparatively yielding, and clearly unable to turn aside a body propelled against it with much force. In a third instance you find almost an entire absence of perineum, the recto-vaginal septum being but slightly thickened below, so that a shallow laceration would extend to the rectum. In a case like the first we have seen the head press firmly down on the pelvic floor, the perineum resolutely resisting the strain for a considerable time, and finally turning the descending head aside and causing it to glide forwards through the vulva, whence it escaped without harm to the soft structures of this part, the integrity of which is so essential to the health of the generative organs. In cases like the second we have seen the long, thin perineum yield under much less strain, splitting to the very margin of the anus. Lastly, in a case like the third, we have seen the deficient perineum left after delivery still more deficient than ever.

Danger of laceration is much augmented by unusual length of the parturient canal below the bony outlet. During descent of the advancing head the soft tissues are pushed more or less in advance, and the greater distance required to be made by the head, and hence the more extensive the curve, the greater the danger to the perineum. This truth is to be borne in mind during our consideration of the proper measures to be adopted for protection of the vulvar structures, and above all in our conduct of labor complicated by such a condition.

At the moment of greatest distension, the very margin of

the perineum at the posterior commissure is nearly always thin, and it is evident that a rent once started is liable to become extensive. We are speaking now of cases left substantially to the natural movements. When a rent is begun it draws the head away from the anterior boundaries, or, more properly speaking, diminishes the pressure against the crown of the pubic arch, with a resulting extension of the laceration beyond the degree essential to easy escape of the head. This is a natural result of neglect on the part of the accoucheur to enforce the true principles of perineal protection about to be enunciated.

Those who carefully examine the perineum during the moment of greatest distension have frequently observed that there is usually a thin margin extending backwards only a limited distance, and then the examining finger comes upon a thick, firm, strong part, which appears to be the perineum proper. This thin portion is made up chiefly of integument and mucous membrane, while the thick part is composed largely of muscular tissue. This is a favorable condition of things to find, but it does not exist in every case, and where it is absent, in a primipara, we ought to be on the alert. When it does exist, laceration, if it takes place at all, is likely to be limited to the anterior thin part of the perineum, exceptionally extending into the muscular structures. In these cases the thick part of the perineal body serves as a boundary to the tear, casting the pressure back on the pubic arch which it had begun rapidly to leave.

We are not among those who ascribe vulvar laceration exclusively either to the head or to the shoulders, nor are we disposed to unite with some in ascribing the accident more frequently to the shoulders than to the head. Still we are quite willing to admit that the perineum is often torn during passage of the trunk of the child. Obstetricians are quite accustomed to say that the trunk can follow wherever the head can go, and as a rule, so it can. Yet we have seen the head pass without injury to the perineum, and a laceration result from pressure of the fœtal elbow as it slipped through the vulva. We are well convinced that more injuries to the perineum and vestibule occur during passage of the head than of any other part; but next in frequency stand the fœtal elbows. The shoulders themselves rarely cause the accident. When the elbow of the child comes over the distended perineum, as it often does, with a

jerk, the structures which had previously resisted most heroically may finally give way.

The conditions which promote solution of continuity at the vulva are more especially met in the primipara. The intact fourchette, the narrow vagina and the resisting tissues are all of this nature. When once the vulvar orifice has been thoroughly distended, it yields more readily a second time. Moreover, though these structures are decidedly elastic, after thorough distension they never wholly regain their former tenseness. It therefore follows that we look for laceration mainly among women for the first time in labor. Still it does occasionally happen that the first child is premature, and hence small, while the second is of full term and much larger. Again, a former laceration may have been repaired, and the conditions met in a second or third labor prove as inimical to the perineum as those in the first.

It should be remembered that the vulva may suffer anteriorly as well as posteriorly. As the head emerges from the vulva, the vestibule can be felt with its thin, tense margin turned towards the head, ready to tear should much further strain be put upon it. This region is a common seat of injury. A laceration in this part usually passes to one side of the meatus urinarius, and when present is liable to make urination somewhat difficult, and, occasionally, impossible. This is a more common cause of retention of urine after delivery than reflex spasm excited by lacerated perineum.

The anatomical conditions being such as we have described, it is plain that rapid descent of the head and sudden pushing asunder of the contiguous structures, with forcible distension of the vulvar opening, are more likely to result in laceration of the parts involved than a dilatory accomplishment of the same parturient act. Here, as elsewhere, haste makes waste. Rapid changes in the human organism are accomplished at unusual risk. Nature's plan is the gradual one. The whole body can be broken down and renewed without pain or disturbance if the work be done by degrees. Cyclonic movements are destructive.

When the perineum is unusually long and comparatively yielding, it is subject to great danger, no matter whether protective measures be adopted or not. Cases have been put on record wherein the descending head has steadily pressed on its center to such a degree and for so long a time, that finally a false opening has been created through which the fœtus has

emerged without rupture of either the posterior vaginal commissure or the sphincter ani. To be sure this is a singular accident, and fortunately rare. There is a form of laceration in such a perineum, however, worthy of special notice, of which I have recently had two or three marked examples, and which is doubtless of great frequency. It is not discovered through mere touch except in bad examples of it, and does not disclose itself to mere inspection unless the same be carefully made. Externally there may be no sign of injury, but upon retracting the perineum and opening the labia, we find the lesion in the form of a superficial rent along the vaginal surface of the perineum, occasioned probably by the head as it pushed heavily along on its way to the vulva. Though of but slight depth,



FIGS. 140, 141 AND 142.—Showing the difference in involved diameters between Flexion and Extension of the Head.

it may be found, on lateral traction, to gape more than an inch. Such a laceration is not likely to be felt very profoundly in the way of weakening the natural supports of the pelvic viscera; but it acquires importance by reason of its favorable situation for taking up septic matter during the puerperal stage.

Now all these dangers are still further augmented by failure of the head, in its descent through the pelvis, to maintain its position of firm flexion in vertex presentation, or firm extension in face presentation. When such proper relations of the advancing head to the pelvis are not maintained, the longest diameter of the head, namely, the occipito-mental, is liable to be thrown into one of the pelvic diameters; and since the former is greater than the latter, the head is likely to become incarcer-

ated and instrumental interference be required. Mere use of the forceps does not necessarily increase the perineal dangers, but the delay at that particular point, and final rectification through forcible flexion, followed by instrumental delivery, does militate against perineal integrity. But the head is far more frequently thrown out of proper position to a moderate degree only, in which case, though incarceration may not ensue, unusual demands will be made on the pelvic outlet, and the vulva in this way come to suffer. This anomalous condition of things thus becomes a prominent factor in the production of perineal laceration.

These are the main facts relative to causation of perineal rupture, plainly, but not nicely put; and now let us turn to a consideration of the prophylaxis of the accident. The original method of managing the head and shoulders as they passed the pelvic outlet was doubtless the expectant one, and some still adhere to it. "Hands off," they say, "and you will get better results than are obtained when attempts are made at prevention." When manual aid became the practice, it was almost the universal custom to "support the perineum." This treatment was based on right principles, but was probably carried to unnecessary and harmful extremes. At any rate, there was a reaction from it, so that now a number of the best obstetricians practice the let-alone method. Reflex action is originated, they say, and the uterus is thereby excited to more energetic contraction, at the very time when modified action is sought. Of this we are not fully convinced; and, while we may not commend the more ancient method, we are fully convinced that, properly used, some form of perineal protection is far better than the expectant plan.

Before we enter upon a discussion of the various methods of protection now in vogue, let us deduce the general principles upon which any form of perineal protection, in order to commend itself to the enlightened judgment of a practical obstetrician, should rest. If we once get a clear conception of these, we shall have little trouble in adapting different methods to varying circumstances. The true principles of perineal protection are four in number, as follows:

1. Prevention of too rapid progress of the head and after-coming shoulders.

2. Maintenance of firm flexion of the head in vertex presentation and firm extension in face presentation.

3. Deflection of the head from its movement of direct descent, causing it to hug the pubic arch; and

4. Relaxation of the vulvar structures so that the necessary dilatation may be obtained without too great strain on the soft tissues.

The first may be accomplished by independent manœuvers, such as plain pressure against the head as it is forced downwards by recurring uterine action; but it is much better to combine this with such measures as will carry into effect also one or more of the other principles. The necessity for this resistance is at the pelvic outlet only, where there is likewise a demand for practice of the other principles. But better than all resistance is a wise modification of the propulsive energy, which may in a measure be accomplished by directions given the woman herself. Uterine action is not, but abdominal action is, in a measure, voluntary. Under command of the will, abdominal action is often surprisingly powerful. To completely overcome it through an effort of the will is utterly impossible, but much can be done by enjoining voluntary propulsive effort and bidding the woman give vent to her agony in cries, while regularity of breathing should be maintained as far as possible. These measures alone may suffice, but in some cases it is advisable to administer chloroform till the rigor of the contractions is broken and the head is thus brought under control.

There are two, and only two, methods of protection for the perineum at the moment of greatest distension worthy of the name. The first is the old one of pressure against it with the flat of the hand in the direction of the pubic arch, and the second is that originally proposed by Fasbender, in the practice of which the head is grasped by the hand in such a way that the points of pressure are at the poles of the occipito-frontal diameter. To do this either the thumb or the fingers will be passed into the rectum, according as the woman is on her side or her back. All other manual measures are fragmentary and undeserving to be called methods.

Manual Protection of the Perineum.—The precise mode of support as applied by the flat of the hand, with the woman on her side, is thus described by Parvin:

"Supposing the patient to be lying on her left side, and her hips quite near the edge of the bed, the practitioner places his right hand so that the concave palm receives the convexity formed by the bulging perineum, the thumb is upon the right,

and the four fingers upon the left labium majus, while the fold between the thumb and index finger corresponds with the anterior margin of the perineum, moderate resistance is made to the force driving the head against the perineum, and at the same time the head is gently pressed toward the pubic symphysis; strong pressure is to be avoided, because, if the perineum be very thin, such pressure at this thinned part may cause a central tear. No napkin should be interposed between the hand and the perineum; the hand is not applied until perineal distension begins, and the application is only during a pain."

When the patient is lying upon the back these details are

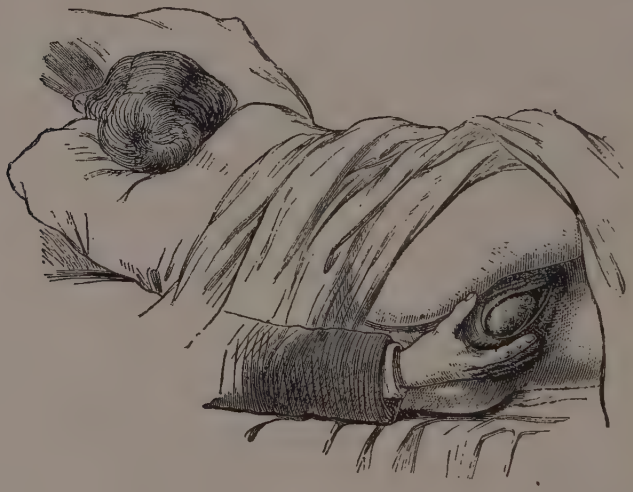


FIG. 143.—Method of Supporting the Perineum, with the patient in Lateral Decubitus.

not observed, but the head is received into the palm of the hand.

This method of treating the perineum during expulsion of the fœtal head, greatly modified as it has been from the old mode, well applies three out of four of the principles hereinbefore laid down, namely, resistance to too rapid advance of the head, maintenance of firm flexion, and elevation of the head well into the pubic arch. What are the objections urged against it? One objection alone, namely, that pressure, even intermittingly, made against the perineum, excites the uterus to fury, through reflex action. Distended and benumbed as is the perineum at such a time. this stricture on the procedure is seen to be most

ridiculous. That the latter does save some perinea, either wholly or partly, we are well convinced.

The second method to which allusion has been made, namely, that wherein the head is brought under control by being grasped over the poles of its long diameter, has a variety of modifications. The following, described by Hart, embraces three of the general principles which we have laid down:

"All the attendant can do," he says, "apart from the familiar means of relaxing perineal spasm by chloroform and hot applications, is to prevent the sinciput being forced down in advance of, or faster than, the occiput. He restrains the fœtal head from advancing too rapidly. He thus has always to get the occiput to lead, and to get it fully born if possible. So far as I can judge, the best way of doing this is as follows: With the patient lying, of course, upon her left side, the attendant places the thumb of his right hand, guarded by a napkin soaked in hot sublimate, in front of the anus and presses it gently there. The pressure is not in the direction of a line joining his thumb and the pubic arch, but nearly in that of the pelvic outlet. By this, descent of the sinciput is hindered, and that of the occiput is favored. When the latter is beginning to pass under the pubic arch, the fingers of the same hand are placed between it and the apex of the arch, so that when the occiput has cleared the arch the fingers are passed towards the nape of the neck, and the head thus grasped in the hand, the thumb lying over the sagittal suture. This gives one complete command over the head which is now engaging in the diameters between the nape of the neck, and forehead and face, and allows the whole passage with as little tear as possible."

Another variety of the same general method is set forth by Lusk as follows:

"In ordinary cases Hohl's method, recommended by Olshausen, has rendered me excellent service. It consists in applying the support, not to the perineum, but to the presenting part. To this end the thumb should be applied anteriorly to the occiput, and the index and middle fingers posteriorly upon that portion of the head which lies nearest to the commissure. The unconstrained position of the hand enables the operator to exercise effective pressure in the direction of the vagina, while the posterior fingers favor the rotation of the head under the pubic arch. The patient should at the same

time be directed not to hold her breath during the pains, except when they are weak and powerless."

In Fasbender's method the patient is placed upon the left side, and when the head appears in the crowning stage, the index and middle fingers are applied to the occiput, and the thumb is pushed down into the rectum, which always stands open, and the head thus seized by the hand and brought under perfect control.

Through use of these latter methods three of the principles of perineal protection are perfectly applied, and we can but look upon them as excellent methods.

Ways and Means for Softening and Dilating the Vulva.—The fourth principle is not an essential part of any method which is peculiarly adapted to the moment of final escape of the head, but is rather preparatory to the final strain. Relaxation of the perineum may be favored by a variety of expedients, among which the application of warm emollients occupies a prominent place. We have frequently drawn away the perineum from the fœtal head between pains, and poured into the space thus formed warm oil, with what seemed to us to be good results. Hot fomentations against the perineum are of utility.

Besides such treatment, when he has special reason to fear rupture, the author exercises dilative pressure to the vulva during the latter part of the second stage. This sort of manipulation should be begun before the head gets to pressing hard on the perineum, as considerable time is required to effect our purpose. The fingers lying in the vagina are pressed with some force in a backward direction during the pains, and in this manner the vulvar opening is gradually expanded so that less time will be demanded when the head shall get to the outlet. The pressure should at no time be very forcible, lest we inflict unnecessary pain and begin a laceration which later may become extensive. The manipulation should at first be made coincidently with the pains, but later can be continued into the intervals between some of the contractions. The obstetrician who does not observe reasonable antiseptic precautions ought never to undertake this treatment. In fact, he who does not conduct his cases in a reasonably aseptic manner ought to have none to treat.

A few years ago Dr. Goodell, of Philadelphia, recommended a practice intended to secure greater safety to the vulvar

structures through perineal relaxation, the manipulation being the very reverse of that which we have been describing. When the head is distending the perineum, it is his plan to mitigate the strain at the posterior commissure by hooking the fingers into the anus and drawing the parts towards the pubic arch. The absurdity of such a recommendation is to our mind self-evident. The head is already pressing too hard upon the perineum, and our aim should be to guide it forwards towards the pubic arch, and finally through it, as rapidly as we safely can. To do so with undue haste would greatly endanger the perineum. A rent begun at its margin through excessive and rapid pressure, may easily be extended to serious proportions. This, of course, we wish to avoid, but to gain relaxation at the posterior commissure at the expense of strong pressure in what might be called the perineal hollow, is unwise. Far better is it to resist farther advance for a time, and then allow the head to make graduated pressure on the posterior commissure up to the moment of safe distension. Throwing the perineal body under the head, as it advances with each pain, does not serve promptly to prepare a safe exit for the presenting part, and seems to me like poor practice. It is postponing the evil moment without changing its character. Advocates may urge that by prolonging the pressure on the perineum we promote softening of the part. This is quite true, but the part which most needs stretching, and that which commands the whole situation, is the posterior commissure, or rather that and the fourchette. The strong muscular part of the perineum can bear a powerful strain, provided the posterior commissure can be kept intact, or can be preserved till the head has nearly passed. But when, before the moment of greatest distension, the entering wedge is applied in the shape of a torn commissure, the laceration is easily carried into the depth of the perineal body.

Lusk mentions a practice which has given him satisfaction, that is also intended to secure relaxation of these parts. "Between pains," he says, "I have been in the habit, in cases of rigidity, of alternately drawing the chin downwards through the rectum until the hand distends the perineum, and then allowing it to recede. It is astonishing how often apparently the most obstinate resistance can be overcome by the simple repetition of this to-and-fro movement, the parts rapidly becoming soft and distensible. Of course it should be discontinued the

moment contraction begins, and care should be taken to effect delivery after uterine action has subsided." This expedient is of some value and worthy of commendation.

By means of the fingers, we have, in a number of instances, practiced expulsion of the head between pains. This can be done in the crowning stage of labor by placing the fingers behind the anus and pressing in the direction of the symphysis pubis; but when no great descent has been attained, that is to say, when the head does not lie in the vulvar opening, proper pressure cannot be exerted without introduction of the fingers



FIG. 144.—Method of Perineal Protection during extraction of the Head. (Zweifel.)

into the rectum. Such manipulation demands the greatest care, as rough handling might injure the recto-vaginal septum. We sometimes watch descent during a pain, with the fingers in the rectum, and as the contraction dies out and recession of the head begins, we hold it forcibly against the vulvar opening. It is only after repeated attempts that expulsion can be effected. The chief advantages derivable from this mode of delivery are found in the avoidance of the on-rush of propulsive energy, and the encounter of less resistance from muscular rigidity. An attentive obstetrician cannot fail to notice with what force the muscles contributing to the formation of the pelvic floor

contract during the recurrent parturient efforts, while in the intervals they remain comparatively quiet. We need not add that this mode of delivery is adapted only to cases wherein there is considerable interval between pains.

There is some danger of laceration attending delivery of the shoulders, but the only prevention lies in the exercise of care, drawing the body well forwards and keeping the elbow off the perineum, where it is so liable to tear the vulvar commissure.

Episiotomy.—But, we inquire, can anything be done to preserve from serious injury a perineum which, by reason of an anomaly in construction, or which, through want of relative proportion between the dimensions of the fœtus and vulva, is very certain to suffer laceration? In 1836 Von Ritgen published an article in which he recommended seven small incisions on each side of the vaginal orifice, to be made at the moment of greatest distension. No incision was to extend more than a line in depth. By this means he claimed that an increased vulvar circumference of two inches could be gained. The depth and number of the incisions have been changed by others, and, as we believe, the character of the operation improved. Attention has been directed to the fact observed by every attentive practitioner, that the chief resistance encountered by the head is not at the thin border of the vulva, but at the narrow ring situated half an inch above, represented posteriorly by the fourchette, and composed mainly of the constrictor cunni, the transversi perinæi, and sometimes of the levator ani muscles. It has been accordingly recommended that the incisions be made through these rigid fibers, by means of a blunt-pointed bistoury, or a pair of angular scissors. So far as practicable, the incisions should be confined to the vagina, and should not exceed three-quarters of an inch in length. Their depth will be determined by circumstances. In cases where the head is about to be expelled, and firm pressure already exists, the bistoury may be carefully introduced, upon its side, between it and the vagina, three-quarters of an inch in front of the commissure, and section made from within outward. The external skin need not be included, and it may be protected by drawing it back before cutting. Instead of several very shallow incisions, we now prefer a single deeper one on each side, at the points mentioned.

In this connection it should be remembered that serious

perineal rupture is nearly always along the course of the raphe, owing to the relative weakness of the part, and the existence of a commissure.

Increased danger of septicæmia has been urged against the operation, but the objection is void of much force. The choice is between two clean incisions and one gaping rupture. It may be said for the incisions that they are situated laterally, are shallow, and together do not present a greater area of absorbing surface than the central rupture which follows the expectant plan of management. The latter, too, owing to its location, is more exposed to the discharges which carry noxious germs,

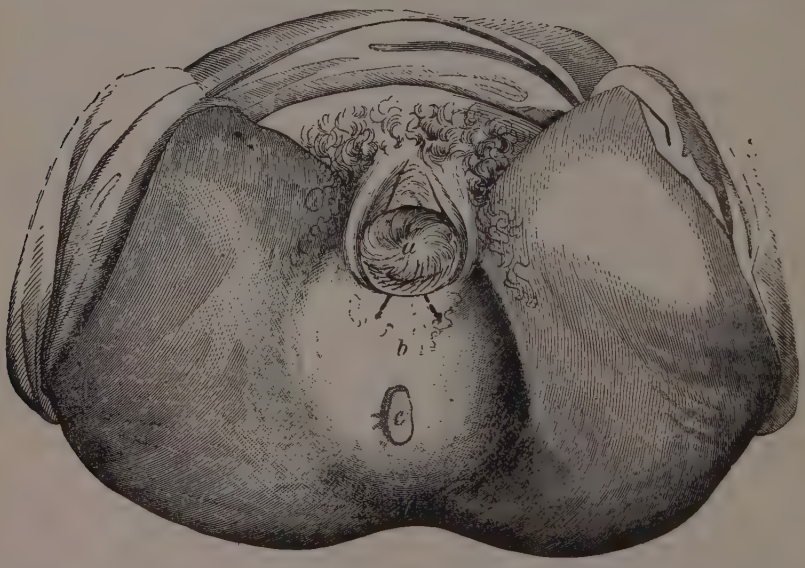


FIG. 145.—Distension and Threatened Rupture of Perineum. *a*, fœtal head. *b*, perineum, showing lines of incision to prevent rupture.

and from its depth, as observed by Dr. Fordyce Barker, permits the lochia to approach "an abundance of blood-vessels, and chains of lymphatic glands."

The incisions thus made should subsequently be closed with No. 2 catgut.

Frequency of Perineal Laceration.—According to Schroeder's experience, the frenulum or fourchette is ruptured in sixty-one primiparæ out of the hundred. More extensive laceration takes place in thirty-four and one-half per cent. of first labors, and nine per cent. of others.

The following table, prepared by Schrenck, gives an idea of the frequency of rupture of the perineum.

	Cases.	Proportion of Lacerations.	Frequency. Primiparæ.	Multiparæ.
Hildebrandt . .	356	7.2%	19.7	.18%
Nippold . . .	1011	11.5%	18.7	2.2%
Olshausen . . .	119		21.1—4.7%	4.7%
Liebmann . . .	1064	15.9%	30%	4.2%
Mewis	1095	19.8%	31.8%	5.8%
Winckel . . .		20%		
Schrenck . . .	847	21.4%	36.6%	8%
Fasbender . . .	300	22.3	34%	10.6%
Schroeder . . .	289	27.7%	34.5—37.6%	9%
Litzmann . . .		27.€		

Extent of Rupture.—There are various degrees and varieties of perineal rupture. A mere margin, involving only the fourchette, may be torn, or there may be laceration of the entire perineal body, so as to make the rectum and vagina one horrible hiatus. Between these extremes are various degrees. Perineal rupture has been divided into classes according to variety and extent of the tear. The most simple classification is that which separates cases into complete and incomplete ruptures. When the laceration extends through the sphincter ani into the rectum, it is termed *complete,* while anything short of that is called *incomplete.* "When the anterior edge of the perineum alone is referred to," says Matthews Duncan, "as for instance, in a laceration not amounting to half an inch in linear extent, it is called the fourchette." This laceration of the fourchette is not reckoned by all as involving the perineum proper, though when the term is made to include more than the anatomical feature known as the fourchette, we believe that it should be. One who has never picked up the four angles of even a slight laceration, and thoroughly spread out the wound, will be greatly surprised, when he does so, at the extent of the raw surface.

"Rotten" Perineum.—There is much difference in perinea as to their ability to withstand a severe strain. Every physician of experience has observed that moderate dilatation will at one time cause rupture, while excessive expansion, in another case, will be suffered without accident. Dr. Matthews Duncan says: "There is no doubt in my mind that, in certain cases, there is

what may be called rottenness of tissue, which destroys the power of the tissues to resist laceration or bursting. In some women, and occasionally, at least, very markedly in the syphilitic, this condition is very easily demonstrated. It is a condition also of many inflamed tissues, and this is exemplified in the perineum."

The ordinary precautions against ruptured perineum have been considered at great length, because of their importance. There is nothing to be added. When we have faithfully applied them, we have done, in a protective way, all that it is possible for us to do, and yet the physician should not forget that, even when he has so done, his patients will occasionally suffer this accident.

DELIVERY OF THE SHOULDERS.—When the head has finally cleared the vulva, the secretions should be wiped from the nose and mouth of the fœtus, and examination then made to ascertain whether the umbilical cord encircles the neck. If the cord be found, it should be loosened by drawing carefully upon it, until it can be slipped over the head, or, failing in this, during extraction it should be passed over the fœtal shoulders, so as to avoid strangulation of the child, and unnecessary and harmful traction. The cord being too short to admit of such treatment, or there being several turns of it about the neck, two ligatures may be hastily applied, and the cord severed between them. After so doing, however, extraction must not be delayed, or the fœtus will perish.

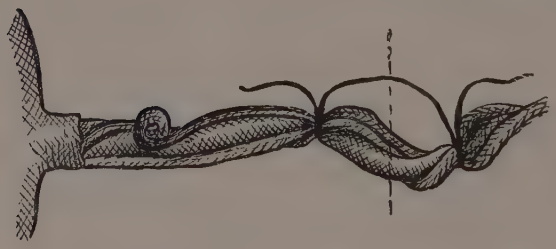


FIG. 146.—Showing ligatures of the Umbilical Cord, and point of section.

In most cases the shoulders are expelled without aid. But, should there be delay, slight traction may be made on the head, while an assistant presses with some force on the fundus uteri. When the movement of expulsion begins, the operator's hand should be placed at the posterior vulvar commissure, and the shoulder raised with some force, as a protection to the perineum. As the arm, or elbow, of that side passes, special protective effort should be made.

As soon as the child is expelled, the little finger of the operator should be passed into the throat, and the face turned downwards, so as to clear the part of mucus.

TREATMENT OF THE CORD.—It is observed that when, from any cause, the umbilical cord is torn in twain, as sometimes accidentally happens, there is little or no hemorrhage. It has been found also that, in many cases, the cord may be cut with scissors, and no ligature applied, without the occurrence of any extensive blood-loss. These, and other considerations, have led some to recommend and practice non-ligation of the cord, as an ordinary mode of treatment. We have given the practice a pretty thorough test in Hahnemann Hospital, and have found that, if we will but await the cessation of pulsation in the cord, it may be cut without fear of hemorrhage, and the case do well. This is probably a mode of treatment which will eventually become common, since it appears to possess some advantages, but the rule of practice is yet strongly in favor of the ligature. Some practitioners lay much stress on the quality and texture of the material used for ligatures, but a string of almost any firm material may be employed. The knot should be about an inch and a-half from the umbilicus, and tightly drawn, so as to prevent the possibility of hemorrhage. A ligature loosely applied is worse than none. In tightening it, the two thumbs should be placed back to back, and the knot made firm by turning them inwards. If direct traction is made, breaking of the string may give rise to umbilical injury from the severe and sudden strain which is likely to be given. A second ligature should then be applied on the side towards the placenta, and the cord severed between the two knots.

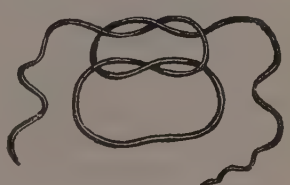


FIG. 147.—The square Knot.

The ligature on the placental side is applied chiefly for the purpose of protecting the bed and clothing from unnecessary soiling. In twin pregnancy it is employed as a preventive of possible blood-loss through vascular relations between the placentæ. The form of knot to be used is the reef, or square knot, as shown in the accompanying figure.

Early and Late Ligation.—The most desirable moment at which to tie the cord is a matter worthy of consideration. The common practice is to ligate it immediately after fœtal expulsion. The errors of such a practice had been pointed out by

several, when Budin, in 1875, at the suggestion of Dr. Tarnier, made the following observations. In one series of experiments the cord was tied immediately after birth of the child, and the blood which flowed from the placental end was measured; in the other series, the quantity of blood was likewise determined in cases where the cord was not tied until after the lapse of several minutes. By a comparison of the results thus obtained, he found that the average amount of placental blood was three ounces greater in the first than in the second series of experiments. Melcker estimated the entire quantity of blood in the infant at one-nineteenth the weight of the body, which in a child weighing seven pounds, would amount to six ounces. In 1877 Schücking in similar experiments first weighed the child at birth, and then observing the changes which took place up to the moment of cessation of the placental circulation, found that it gained from one to three ounces in weight by the delay. An allowance should also be made for the portion which escapes observation in the interval before the weight is taken.

What brings about the transfer of the blood from the placenta to the child is an unsettled question. Budin believes that with the first inspiration, the increased flow of blood to the lungs sets up a negative pressure in the vessels of the systemic circulation, so that a suction force is exerted upon the placental blood, which condition is maintained until the equilibrium is again established. To tie the cord at once, therefore, prevents the adequate supply of the demands created by functional pulmonary activity. Schücking takes a different view, maintaining that, after the first breath, thoracic aspiration ceases to constitute an active energy, and that the main force which operates to cause a transfer of the blood is the compression exerted by the retraction, and, at intervals, by the contractions of the uterus.

From clinical observation and experimental research, the just conclusion is that there is an element of truth in both these theories concerning the cause of the phenomenon in question.

Several observers have shown that the loss of weight which occurs in the first few days after birth is less, and the period of loss is shorter, when the ligature is not applied until pulsation in the cord has ceased, and the children are more likely to be red, vigorous, and active. This may also explain some of the advantages claimed for non-ligation of the cord, inasmuch as

pulsation generally ceases before the scissors are used. As soon as pulsation does cease, the cord ought to be cut, or ligatured.

Porak and Ribemont have lately gone over this question thoroughly, and the general conclusions they have reached are: 1st. Tardy ligature ensures to the infant an extra quantity of blood, amounting to about two and a half ounces. 2d. The blood contained in the placental vessels is necessary to the circulatory system of the infant. 3d. The cause of the entrance of this blood into the fœtal circulatory system, is, in particular, thoracic aspiration. The pressure of the uterus is purely an adjuvant and a secondary cause. 4th. Immediate section, and bleeding from the cord, should not be practiced in case of venous asphyxia of the new-born. 5th. Tardy ligature does not expose the infant to any danger, whether immediate or remote. 6th. The new-born, through tardy ligature, loses less in weight, and regains what it does lose more quickly. 7th. The delivery of the placenta would seem to be facilitated through tardy ligature. 8th. Ligature and section of the cord should never be resorted to until pulsation in it has ceased.

The physiological time at which to ligate and cut the cord appears to be, as stated, immediately upon cession of pulsation in it.

The Third Stage.—After severing the cord the child will be handed to the nurse, who should wrap it up warmly and lay it in some safe place, deferring the necessary attentions to it until after the mother has been cleaned up and made comfortable. Meanwhile the physician attends to the duties of the third stage, which have reference to the promotion of uterine contraction, the prevention of hemorrhage, and the expulsion of the placenta. To remove the placenta, when not expelled by the natural efforts, the old method consists of traction on the cord, at first in the axis of the superior strait, and finally in that of the outlet. But, owing to insertion of the cord into the placenta near its center, this sort of treatment is liable to create inversion of the placenta, causing it to present at the os uteri by its broad surface, and making delivery of it unnecessarily difficult. Moreover, it has been claimed, with good show of reason, that by traction on the cord and inversion of the placenta, suction is liable to give rise to hemorrhage. Besides which, traction of this sort has been known to produce inversion of the uterus.

DELIVERY OF THE PLACENTA BY EXPRESSION.—A method of placental delivery introduced by Credé a number of years ago is at present commonly employed by many of the best obstetricians. This consists in the application of a *vis a tergo* by means of the hand applied to the uterus through the abdominal walls, instead of the old method of *vis a fronte*. For a few minutes after delivery of the fœtus the hand is laid upon the fundus, and slight friction made until the uterus is felt to contract with force, when, with the hand grasping the fundus as best it can, firm pressure is made in a direction downwards and backwards, i. e., towards the hollow of the sacrum. In this manner the placenta can usually be expressed, though repeated attempts may be required. The effort at expulsion is always to be made coincidentally with uterine contraction.

There are at present indications of a disposition on the part of many who have heretofore employed this method, to abandon its exclusive employment, and adopt the mixed method, which is certainly better adapted to the general practitioner's use.

Schroeder says: "I consider it the best procedure in the placental period, after the expulsion of the child, not to rub or press the uterus, but to wait quietly until the diminution and ascent of the uterine body and the protuberance of the symphysis indicate that the placenta is expelled from the uterine cavity, then, by gentle pressure, to expedite its passage through the vulva."

THE COMBINED OR MIXED METHOD OF PLACENTAL DELIVERY.—Though Credé's method of delivering the placenta seems simple and easy, many have in practice, found it extremely difficult. This is probably owing, in most instances, to deviations from the prescribed rules, while in others it has probably occurred mainly through fear to apply the necessary amount of pressure. The author has found much greater satisfaction in combining the two general modes of placenta delivery, namely, pressure on the fundus uteri, and traction on the cord. We believe this mode of treatment free from serious objections, while it proves remarkably effective and easy. Plain traction outside the vulva ordinarily suffices, but if delivery be not easily accomplished, a short hold should be taken on the cord, within the vagina, so that traction can be made in a line approximating the axis of the brim, while with the disengaged hand simultaneous pressure is exerted on the fundus uteri.

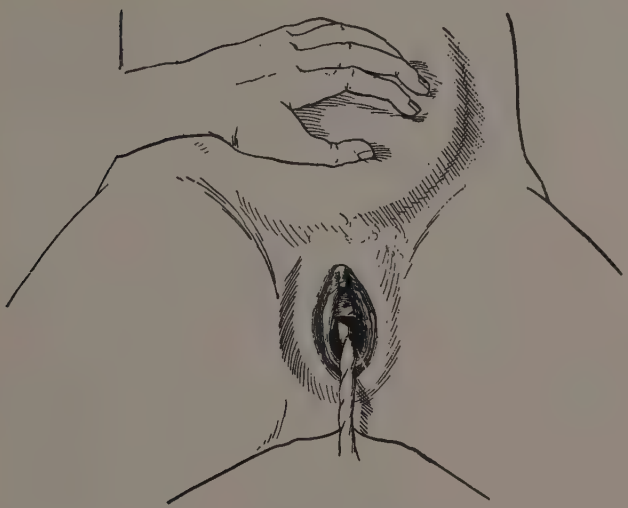


FIG. 148. Delivery of the Placenta by Expression. (After Auvard.)

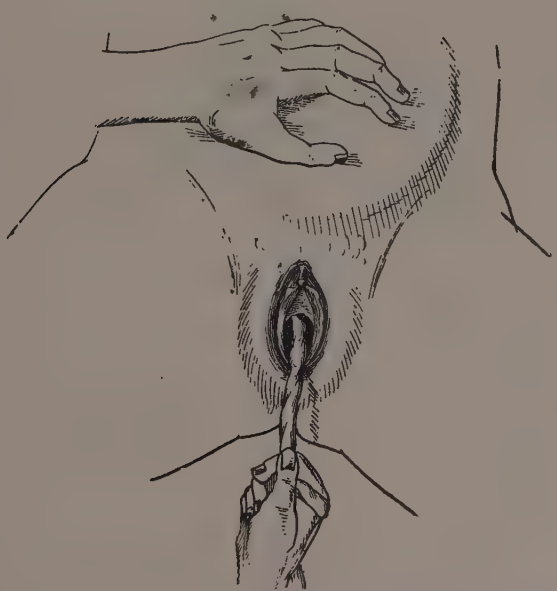


FIG. 149. Delivery of the Placenta by the Mixed Method. (After Auvard.)

It will occasionally be found that the cervix is completely occluded by the mass, and the placenta cannot be brought away unless the fingers first be introduced and the margin of it hooked down so as to secure the ideal presentation.

Extraction should be slowly effected, to avoid tearing the membranes. The latter are usually left trailing in the vagina after birth of the placenta, and in order to secure their com-



FIG. 150.—Rotation of the Placenta during Delivery to make a Cord of the Trailing Membranes.

plete removal it is best to twist them into the form of a rope, and extract them with the utmost care. After expulsion or extraction of the placenta and membranes, the physician should see that the uterus remains well contracted. In most cases we find that organ firmly condensed in the hypogastrium, in a condition known as "cannon-ball contraction."

MANUAL COMPRESSION OF THE UTERUS.—Throughout the third stage of labor, and for a varying period thereafter, the hand of the physician, or some trusted assistant, should rest upon the fundus uteri with a moderate degree of pressure. If, after placental delivery, the organ manifests a decided tendency to relax, friction and kneading of the abdomen should be practiced, to excite uterine contraction. This sort of treatment should in no case be omitted, as its influence upon the third stage of labor, and the puerperal state, is decidedly salutary.

It is the practice in Carl Braun's clinic to apply gentle friction to the fundus uteri twice daily for the first two days after delivery.



FIG. 151.—Inversion of Placenta from Traction on the Cord.

Immediate Repair of Lacerations.—After completion of the third stage, the cervix uteri and the vulvar structures ought to be carefully examined for rents. Such examination can be made of the vulvar structures only by painstaking inspection in good light. Lacerations of the cervix can usually be made out by means of the finger alone, but the lips of the os are at this time so flaccid and irregular that sometimes inspection only can settle the question of their integrity. Rents are usually on the posterior surface of the vagina, alone, or in association with serious involvement of the perineum.

We are not aware that much has anywhere been said concerning immediate repair of cervical lacerations, but we have been experimenting considerably ourselves, and are thus far well pleased with the results of the operation. It is doubtless an admissible operation in the hands of one who is accustomed to work of a similar kind in the vagina, but cannot yet be safely recommended to the general practitioner. In performing the operation we introduce posterior and lateral vulvar retractors, fasten a bullet forceps or double tenaculum into each lip at the angle of the wound, and, beginning at the upper angle of the laceration, close the rent with a continuous catgut suture.

Care needs to be exercised not to break the cervix by means of the forceps, as the tissues are exceedingly soft and easily torn. With respect to the perineum, there can now be no reasonable doubt that immediate repair is not only advisable, but, in most cases, obligatory. To be sure, in rare instances spontaneous repair takes place, but in these days of surgical precision, we are not justifiable in adopting the expectant plan of treatment. "Hitherto it has been my custom to apply stitches in those instances only where solution of continuity was considerable," we say in a recent lecture, from which we here quote at considerable length, "and the loss of firmness to the pelvic floor seemed decidedly inimical to the maintenance of organs in their proper relations. This I now believe to be slovenly practice. We ought not to forget that there are other considerations of a highly important nature besides those just mentioned. I am fully persuaded that the time is coming, and, indeed, is not distant, when it will be regarded as the accoucheur's duty to make a careful examination of the vulva and vagina immediately after labor, and repair with precision *any* rent which he may discover. Moreover, I believe you will do well to follow this practice from the very beginning. It will be somewhat embarrassing, and may be met with some criticism at first, but will become tolerated and at last sought. People are ultimately well pleased with the doctor who evinces care and consideration in the management of his patients. Some of your colleagues and competitors will cry 'nonsense,' but you will soon silence them by delicately pointing out in individual cases the unfavorable results of the old expectant plan of management. The cry of 'meddlesome midwifery' raised by some is getting to be stale. I do not believe that perfect license should be given



FIG. 152.—Marginal Presentation of the Placenta. *U*, uterus. *S*, blood. *P*, placenta.

every practitioner to do as he please; but I think the lines drawn by some are altogether too hard and fast. I am not running breathlessly after the surgical idea, yet *the conviction has taken fast hold of me that all of our obstetrical cases should be treated in accordance with approved surgical principles.* The science and art of obstetrics have advanced side by side with surgery, and right there they hold their position. The cry of 'meddlesome midwifery' was first raised by that man who, in his day, was the prince of obstetricians, Blundell; but had it been heeded by all, the practice of obstetrics would have remained where it then was, and ill-health and death after childbirth, though even now altogether too frequent, would have been as common as it then was.

"Labor, they say, is a physiological process; and so it is. The effort, constantly made by nature to prevent disease germs getting a dangerous foothold in our bodies, is a physiological one, and yet, when the struggle waxes warm and we begin to feel it, the movement is called pathological, and artificial aid is invoked. Who can draw a clear line between physiological and pathological processes? In other words, who can say when the physiological bounds are passed? Labor is truly a physiological process, in general, and the puerperal state is likewise physiological; but certain pathological conditions are liable to be associated with them. My own conviction is that we are justified in aiding nature in her efforts, during the time when unusual efforts are required, so far as we safely can. After labor, if wounds large or small are found, standing as open doors for the entrance of infection, and as the possible points of future irritation, I say close them under antiseptic precautions. Sew up the wounds which have been made in the performance of the physiological process of parturition, and you will do much to ward off the evil effects which stand ready to assail defenseless women at this critical period.

"The conditions surrounding such cases are not altogether favorable for a practice of this kind, and it may take some force of character to follow it. Nevertheless, unfavorable environment is a poor excuse for neglect of duty. It very likely is a case of first labor, and the woman, for a number of agonizing hours, has been receiving that astounding revelation of suffering common to unsuspecting primiparæ. At times she almost sank under the power of it; but bravely rallied and struggled to the close. She hopes to rest in the calm succeeding

the storm, but you decree otherwise. The genital tract must be examined and all rents repaired. The friends say, 'Yes, to be sure. Poor child.' But the patient, weary and worn, says 'No, no. I can endure no more.' The friends say 'Yes,' but to one another they may add the damaging comment, 'There ought to have been no injuries.' All this, though unpleasant, ought not to deter. Do your duty. Finish up the case in a workmanlike manner and you shall ultimately have your reward.

"I believe the details of this operation to be as important as those of any minor operation, and if the work is to be done at all, it ought to be well done. Surely, if there is a call for antiseptic precautions, it is right here. Look at the conditions. The woman has been in labor for several hours; the discharges have bathed the vulva, lying there exposed to the air, and doubtless undergoing some change, while the fingers of the attendant have been passing in and out of the vagina from time to time during the whole period. It may be that fæces, as well as urine, have found their way to the parts, and thus in one way and another the conditions favorable to infection have been strengthened. The fact is, if we expect to do a good piece of work it is just as essential to make elaborate preparation for the immediate as for the secondary operation. That is not customary, I am free to admit; but in this particular I would have you practice an innovation. I want you to go out from the college as thorough, painstaking, skillful obstetricians. We want you to be all that you seem, and then we shall be proud to own you as our alumni.

"In order that you may give these wounds proper attention, I recommend as a part of the regular obstetric outfit, the following articles: four pairs of tenaculum forceps; one short, but broad, perineum retractor; two lateral retractors; several full-curved suture needles, an inch and a quarter to an inch and a half in length; a good needle-holder; plenty of catgut of various sizes, in juniper oil; a large fountain syringe having a nozzle provided with a stop-cock, by means of which the stream of water can be regulated; and a good rubber protection for the bed. These are in addition to the usual equipment. The sheet should be so arranged that it will carry the water and blood into a receptacle placed in front of the bed. Since the bed is very yielding it will be necessary in most instances, to place a broad board of suitable length upon the springs,

beneath the mattress, and also plenty of padding under the hips beneath the rubber. I carry in my bag a rubber sheet with an inflatable edge like a bed-pan, which when not inflated, may be rolled up so as to take but little room. Put the woman in position on this after she has been anæsthetized, and in the absence of assistants, fasten up the legs by passing a sheet through the popliteal spaces and then around the neck, tying it sufficiently tight to keep the extremities out of the way. If she has been under an anæsthetic, we need but prolong its influence. If but small wounds have to be sewed, an anesthetic may not be required. Then turn on carbolated water from the syringe and thoroughly wash the parts, including the vagina. Use soap externally and dry with a clean towel.

"With the instruments at hand in a bowl of carbolated water, you will be prepared to operate. Sew up first any lacerations which you find in the vagina, then those of the vestibule, and finally those of the perineum. Before beginning, be provided with two or three needles threaded with strong catgut (No. 2 being a favorite size), the threads being long, and deposit them with the instruments in the antiseptic solution, or place them in a separate dish if you prefer. They are soon softened by the water, and become as easily handled as silk. You will find it convenient to tie in the thread, since otherwise, during the operation, it may slip from the needle and occasion some annoyance. Seize the angles of any wound which you find, so as to steady it and make stitching easy, snip off fringes and irregularities which may interfere with union, and then close it with a continuous suture. Be careful to tie the thread at the finish so that it will not loosen.

"In this manner you will close small wounds; but those of considerable size, and especially those which involve muscular structure, as in the perineum, will require additional care. The four corners of an incomplete laceration of the perineum should be picked up with the forceps, and the suturing begun above, that is to say, at the vaginal end. The first one or two sutures ought to be interrupted, and firmly tied. Then entering with the long thread, you may begin the continuous suture, the two lateral and upper forceps being steadied by assistants, and the whole wound kept in perfect view. You may make complete closure with a single row of stitches, provided the wound be not large; but if a single row will not draw the parts into perfect apposition without tension, why then, after taking a

few turns through the edges, you should dip down into the depth of the wound, and gather up the tissues therein, as you proceed toward the lower angle of the rent. After the suture emerges at the lower angle, you should take a new long thread, unless the first is of sufficient length to carry all the way back, and run a continuous suture toward the angle of the wound where the first needle entered, taking in the margins of the tear, and thoroughly closing the wound.

"This procedure is well shown in figure 153. It will be observed that, in going forwards on the return, the sutures touch the integumental surface for a distance, but end on the mucous surface of the vagina. If the operation be well done, and the thread not drawn too tightly, repair will almost surely ensue; the catgut sutures will be absorbed, and the occasion for dread which some women have of the taking out of the stitches be avoided.

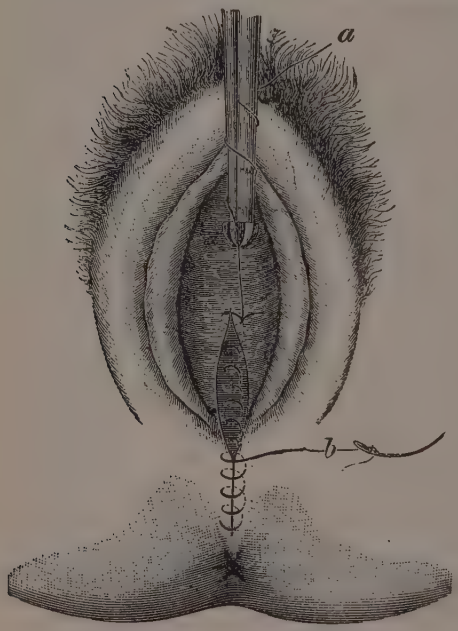


FIG. 153.—*a*, Forceps holding Thread where the continuous Suture began. *b*, The continuous Suture returning and closing the Wound over the deep stitches.

"The treatment of complete rupture of the perineum has heretofore been followed by incomplete repair in a large percentage of cases; and it is found necessary in any instance, in order to secure a perfect result, to pay strict attention to details. The wound should be drawn open, as in the incomplete variety, with forceps at the angles. Since the lower angle is split by the rent into the rectum, two forceps will there be required. The first attention should be given the rectal wound, which must be delicately and firmly closed. In this part of the operation interrupted sutures ought to be used. The needle is first made to enter at the upper angle of the wound, at the very margin of the flap, in a direction from the rent out-

wards, splitting the part for a short distance, and emerging on the raw surface. It is then carried over to the opposite side and made to travel from the outer side towards the edge, splitting the flap in a similar manner, and finally emerging at the very margin of the flap without penetrating the rectal mucous membrane. It is tied on the rectal side. Other sutures follow till the wound is fully closed. Coaptation of this part of the laceration having been accomplished, the rest of the wound should be treated as in the instance of incomplete rupture. It is highly essential to success here, as in other cases, that

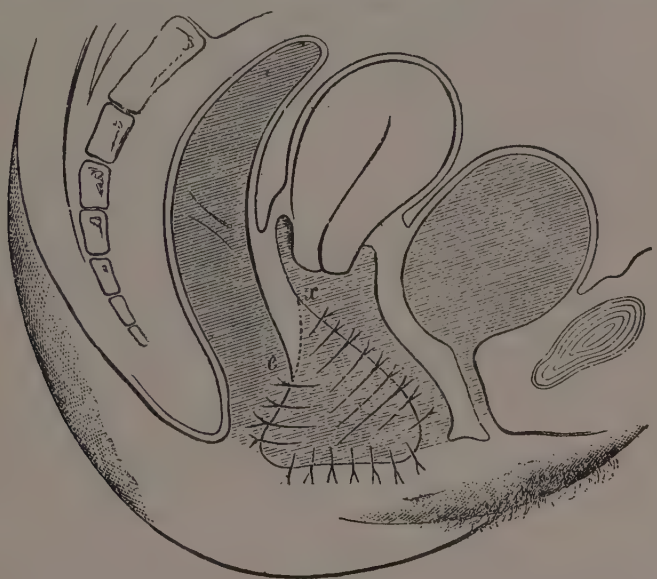


FIG. 154.—Antero-posterior section, showing at *e* the beginning and at *x* the end of the Suturing in Complete Rupture.

the raw surfaces be brought together in an equable manner, so that every part will lie in contact, and thus no pockets be left.

"In putting in the catgut sutures care should be exercised not to place them too close together, nor to draw them too tightly. Perfect coaptation is the only requisite. Some little experience soon teaches one the art of accomplishing this in a desirable manner.

"During introduction of the sutures, tension should not be strong on the forceps; and it is advisable now and then to bring the surfaces together in order to make sure that the

needle enter at opposite points, and unnecessary suture tension and distortion thus be avoided.

"Carefully wash and dry the exposed surfaces, and apply to the vulva an antiseptic pad or napkin to catch the lochia.

"After-treatment consists in careful cleansing of the parts, an occasional vaginal douche given in the most gentle manner, and perfect quiet. The urine should be voluntarily voided, and the parts immediately dried. Perfect quiet for a long period is essential in bad cases. In any case the patient should remain in bed longer than after normal parturition. The knees would better be padded and bound together for a few days, though this is not a necessary precaution. You will observe that I have recommended no sutures for a lacerated cervix, though I am quite well convinced that it is good practice to introduce them. I am experimenting in this direction, as some of you know from observation, but am not yet prepared to recommend the operation to the general practitioner. In conclusion, I wish to repeat with emphasis that I believe the time is coming when *all* recognized lacerations will be repaired immediately after delivery, with the same punctilious care that we manifest in attending to the ordinary details of labor. When this comes to be the rule, gynæcologists will not multiply as they now do, for their occupation will be gone."

Post-partum Care of the Woman.—The general condition of the woman, and the special state of the uterus, should be carefully watched for some time after delivery. First of all the patient should be warmly covered to prevent the occurrence of chilling. The manual attention given to uterine contraction, before mentioned, should be maintained in simple cases for at least fifteen minutes after placental delivery. The pulse should be consulted, as it is a sort of criterion from which to draw valuable conclusions. If it is found to be rapid, the case requires undivided attention so long as it thus continues, while if quiet and regular, little anxiety need be felt. The physician should in no case leave his patient within the first half hour after delivery; and if hemorrhage has been threatened, he should stay much longer.

The administration of *arnica* should be begun immediately, and, in the absence of more specific indications, ought to be continued hourly during the first twelve or twenty-four hours.

When the hand is removed from the uterus, the nurse, and other assistants, should withdraw the soiled clothes, and make

the patient as clean and comfortable as possible, without much disturbance. It is good practice to have the nurse also wash out the vagina with a gentle stream of warm water, the point of the tube being introduced into the vagina but a short distance, and everything being done under antiseptic precautions.

THE BINDER.—The use of the binder is a point in practice over which there has been much discussion. Some practitioners of much repute believe that it is not only valueless, but positively harmful, and utterly discountenance its use. Every careful observer, however, must admit that a certain amount of pressure is essential to the patient's perfect comfort. After labor women feel as though they were "falling to pieces," and the binder, if it does no more, certainly contributes greatly to their comfort. To completely fulfill the requirement, it must be properly applied. If too narrow it will not keep its place, and is liable to do more harm than good. The proper width varies somewhat in different cases, but the average is about ten inches, the intention being to cover the entire abdomen. To do this it must be brought well down over the hips. Almost any material will answer the purpose, but a strong piece of unbleached muslin is preferable. By some, a pad, consisting of a large napkin, or small folded towel, is placed upon the hypogastrium, beneath the bandage, and upon the contracted fundus uteri, but we do not advise its use.

To make a neat and effective application of the binder is a thing not easily accomplished by the novice; and yet every physician ought to possess the necessary skill. Properly to place it under the woman's hips requires the services of two. When this has been done, the physician should hold the end near him between the thumb and fingers of the left hand, while he draws the opposite end tightly over it, and fastens pin after pin. Seven or eight safety pins should be used and, when fully applied, the binder must be free from wrinkles. The woman's toilet is completed by placing a warm and thoroughly aseptic napkin at the vulva to receive the discharges. If now comfortable, and her pulse quiet, she may be left by the physician in care of her nurse, who, if not well acquainted with her duties, should receive explicit instructions.

We cannot close this account of the general management of normal labor, without emphasizing the superlative importance of most rigid attention to cleanliness. Make sure that in no

possible manner septic matter reach the patient before, during, or after delivery.

Therapeutics of Labor.—In the course of normal labor there would seem to be but few occasions for the use of remedies, but unpleasant symptoms are sometimes associated with the usual phenomena, and without being essential parts of the parturient action, are amenable to the suitable remedy. The indications, as applied to labor, are, of course, purely clinical, as we have no record of extensive provings made during the parturient act. We here append the following indications as occasional guides to the right remedies:

LABOR PAINS.—Inefficient, etc.—Violent and frequent, but inefficient: *aconite.*

Too weak, not regular: *æthusa.*

Violent, inefficient: *arnica.*

Tormenting, but useless, in the beginning of labor: *caulophyllum.* This remedy rarely fails to produce a good effect.

Short, irregular, spasmodic, patient very weak, no progress made: *caulophyllum, actæa rac., pulsatilla.*

Spasmodic irregular: *cocculus, pulsatilla, caulophyllum.*

Spasmodic: *causticum, ferrum, pulsatilla.*

Spasmodic, cutting across from left to right, nausea, clutching about the navel: *ipecac.*

Spasmodic, painful, but ineffectual: *platina.*

Spasmodic, they exhaust her, she is out of breath: *stannum.*

Spasmodic and distressing, tearing down the legs: *cham.*

Insufficient, violent backache, wants the back pressed, bearing down from the back into the pelvis: *kali c.*

Distressing, but of little use, cutting pains across the abdomen: *phos.*

Ineffectual, of a tearing, distressing character, they do not seem to be properly located: *actæa.*

Severe, but not effective; she weeps and laments: *coffea.*

Weak, False, Deficient.—False, labor-like pains, sharp pains across abdomen: *actæa, caul.*

Pains weak or ceasing, wants to change position often, feels bruised: *arnica.*

Weak or ceasing, will not be covered, restless, skin cold: *camphor; c. c.*

Deficient or absent; she has only slight periodical pressure on the sacrum, amniotic fluid gone, os uteri spasmodically closed: *belladonna.*

Weak or ceasing, with great debility, especially after exhaustive disease, or great loss of fluids: *carb. v.*

Pains become weak, flagging, from long-protracted labor, causing exhaustion; patient thirsty, feverish: *caul.*

Cease, from hemorrhage: *china.*

Ceasing, with complaining loquacity: *coffea.*

Weak, or accompanied with anguish; she desires to be rubbed: *natrum m.*

False or weak, spasmodic, irregular, drowsy faint spells, with weak pains: *nux m.*

Deficient, irregular, sluggish: *pulsatilla.*

Weak and ceasing: *thuja.*

Deficient, with os soft, pliable, dilatable: *ustilago.*

Suppressed, or too weak: *secale.*

Cease, coma; retention of stool and urine—from fright: *opium.*

Strong.—Excessively severe: *coffea, nux v.*

Too prolonged and powerful: *secale.*

EFFECT ON PATIENT.—Labor-pains make her desperate, she would like to jump from the window, or dash herself down: *arum tri.*

During pain she must keep in constant motion, with weeping: *lycopodium.*

Cause fainting: *nux v., verat. alb., puls.*

Cause urging to stool, or to urination: *nux v.*

Excite suffocative or faint spells, must have the doors and windows open: *pulsatilla.*

Exhaust her; she faints on the least motion: *verat. a.*

Cause weeping and lamenting: *coffea.*

LOCATION AND COURSE OF PAINS.—Pains principally in the back: *caust.*

Pains worse in the back: *nux v.*

Pains worse in the abdomen: *pulsatilla.*

Pains run upward: *lycopodium.*

Pains like needles in the cervix, especially with rigid os: *caulophyllum.*

SPECIAL AND PECULIAR SYMPTOMS.—Cardiac neuralgia in parturition: *actæa.*

During labor cannot bear to have her hands touched: *china.*

With every uterine contraction, violent dispnœa which seems to neutralize the labor-pains: *lobelia.*

Labor progresses slowly, pains feeble, seemingly from sad feelings, and forebodings: *nat. mur.*

Cessation of labor-pains; retention of stool and urine, often from fright: *opium.*

Contractions interrupted by sensitiveness of vagina and vulva: *platina.*

CHAPTER IV.

USE OF ANESTHETICS IN MIDWIFERY PRACTICE.

In treating the subject of anesthetics in obstetrical practice, we should divide cases into two general classes: 1. Cases of normal labor, wherein we seek merely to mitigate the ordinary pangs of childbirth, and 2. Cases of an abnormal, or unusual, nature, wherein operative interference is necessitated.

1. Cases of Normal Labor.—Obstetrical Anesthesia.—The use of anesthetics in normal labor differs essentially from its employment elsewhere, in the design of its employment, and the extent to which its action is carried. We aim in such cases not completely to annul sensibility, and subdue muscular resistance; but merely to modify the agony associated with the propulsive stage of labor. When from purpose or accident the anesthetic influence is permitted to exceed this limit, new dangers arise, and fresh complications are met. To accomplish our purpose, continuous inhalation is not required, and should not be permitted, but the lethean vapors ought to be applied just before and during the pains.

The form of anesthetic best adapted to such purposes is unquestionably chloroform. It is more speedy, pleasant, and energetic in its effects than ether, and in parturition it has proved to be quite as safe. In surgical practice its effects have occasionally proved fatal, but when administered during labor, according to the directions which follow, scarcely a death has resulted.

Parturient women are easily put under its influence to the extent required for immediate purposes: a few inhalations of its vapors, begun just before the expected recurrence of a pain, and continued during it, being sufficient to allay excessive sensibility, and quiet the nervous erethism so often observed. The nurse, or some self-possessed assistant, is instructed to pour upon a folded handkerchief or napkin fifteen or twenty drops of the chloroform, and place it within about half an inch of the nose and mouth, thereby giving free access to atmospheric air. We have found Esmarch's inhaler very convenient for the purpose. None of the chloroform should be permitted to touch the patient's skin, as the smarting produced by it would be liable to excite fear. It is a good plan to apply the chloroform

to the handkerchief soon after the close of a pain, and then roll the latter tightly in the hand to prevent evaporation, until the pain is about to return. Otherwise there is liability to delay, and the patient is as greatly annoyed by the bungling work of the person in charge of the anesthetic as by the labor-pains themselves. By such administration of chloroform, consciousness is not interrupted. The patient may at the time declare that her sufferings are nearly as keen as before; but when the labor is past, she will be enthusiastic in her praise of the virtues of the anesthetic. Women who have once taken it are not willing to be deprived of its soothing influences in subsequent labors.

The usual objections raised against the use of chloroform in labor are not here forcible, since the effect is so moderate that it is not capable of materially modifying the pains, precipitating post-partum hemorrhage, or producing any of the other ills sometimes attributable to a use of the drug when administered more freely.

The period in labor when the use of an anesthetic should be adopted varies in different cases. It is wise, however, to defer anesthesia until near the close of the second stage. When once begun, its action must be maintained until the close of fœtal expulsion, as the woman will not tolerate a suspension of the pain-soothing influences. Hence, to begin early involves long continuance. The most intense pain is suffered in the latter portion of the propulsive stage, and this part of labor, if any, ought to be lightened. In some instances of extreme excitability, and terrible suffering, the chloroform may, with perfect propriety, be earlier exhibited.

2. The Use of Anesthetics in Operative Midwifery — SURGICAL ANESTHESIA.—The effect of the anesthetic, in those cases where operative procedures are necessary, is carried to a greater extent, and, possibly, involves the patient in greater danger. That there is a certain degree of peril to life associated with the administration of any anesthetic, no one will question, and that it is greater in the instance of chloroform, none who have familiarized themselves with the general subject of anesthetics will presume to deny. Every few weeks a case of death under chloroform finds its way into public print, thus giving strength to popular fear. And yet a careful analysis of such fatalities generally discloses, as an efficient cause of the accident, a flagrant disregard of the rules laid down for the administration

of this potent, and hence dangerous, substance. The fatalities occurring in the dentist's chair largely preponderate, the patient occupying a semi-recumbent position, which is wholly at variance with the teaching of all clinicians.

Attention should be directed to the difference in point of mortality under anesthetics between surgical and obstetrical patients. In surgery we have many recorded cases of death, and their number is being augmented from time to time; but this is not true of midwifery. In fact, but few fatal cases in the latter branch of practice have ever gone upon record. The explanation of such divergent results is not altogether satisfactory, but we opine that it may be found in the increased cardiac energy growing out of the circulatory changes of pregnancy, elsewhere described. But whatever our theories regarding the cause, the truth remains, and has become familiar, even to the general public.

Anesthetics are said to predispose to post-partum hemorrhage, which is generally a complication directly dependent on atony of the uterine muscles. Extreme vascular fullness is maintained by the flaccidity of the tissues, while the exposed vessels at the placental site freely bleed. The effect of anesthetics on uterine contraction is marked, as the author has repeatedly demonstrated. This effect is rather more decided in chloroform than in ether inhalation. A moderate degree of anesthesia may be produced without essentially modifying uterine action; but as the impression becomes more profound, the contracting organ is partially or wholly subdued. If this is the effect of anesthetics on the uterus during labor, when the organ is stimulated to action by its contents, we should be prepared to find a corresponding condition protracted somewhat into the post-partum stage. That we do find more or less relaxation after extrusion of the fœtus and secundines in such cases, is beyond question; and yet it is not so marked, nor so persistent, as some suppose. Remove the vapors from the woman's nostrils during labor, and the contractions which have been extremely feeble, or altogether absent, are soon renewed. In like manner after delivery, when the more profound effects of the chloroform pass away, uterine atony generally gives place to a favorable tone of the muscular fiber. The result is that hemorrhage of moment rarely ensues. Occasionally there is a sudden profuse gush of blood soon after the placenta is removed, especially when the anesthetic influence has been

maintained to the very close of the second stage, or longer; but hypogastric pressure, and moderate use of cold water, are nearly always capable of speedily arresting the flow. In the Hahnemann Hospital it is our custom, as a preliminary to the introduction of a class of students, to bring the woman profoundly under the influence of chloroform; and though narcosis is frequently maintained for a period of one and a half, or two hours, among the hundreds of women confined there during the past few years, not a single case of alarming hemorrhage has been met. Our practice is to keep a close watch over the patient for a considerable time after delivery, and give attention to the first indication of trouble. Pressure is made on the fundus uteri for fifteen or twenty minutes after fœtal and placental expulsion, in ordinary cases, and longer in those presenting suspicious symptoms. If the uterus is felt to relax beyond a normal limit, and does not respond at once to abdominal pressure, the vulva is inspected, and, if necessary, cold applications, and manual irritation of the os uteri, are employed. It is rare that more energetic measures are required.

The question has often been asked—Does an anesthetic administered to the mother, produce any effect on the child in utero? We have been led by experience to give an affirmative reply. For example, in a difficult instrumental case which came under the writer's care, wherein sulphuric ether was administered for an uncommonly long time, the child, though but a few minutes before birth it was proved by auscultation to be living, was still-born, and resisted all efforts at resuscitation. About forth-eight hours subsequently, dissection of it was begun by some students, and when the viscera were exposed, the odor of ether was distinctly recognized.

In most instances, where the mother has been long subjected to anesthesia, the child is comparatively inactive for some time after expulsion. It is really uncommon for children born under such conditions to utter the cries so generally heard at the birth of children whose mothers have not been under anesthetic influences. And yet, that decidedly deleterious effects are often produced, there is much reason to doubt.

Dr. J. C. Reeve, in the "American System of Obstetrics," says that a careful study of the subject of accidents from chloroform during parturition justifies the following statements:

1. But one well authenticated case of death is on record where the administration was by a medical man, and in that case no autopsy was held.

2. Dangerous symptoms have occurred but a very few times, and then almost always from violation of the rules of proper administration.

3. The danger when chloroform is used only to the extent of mitigation or abolition of the suffering of childbirth is practically *nil*; when carried to the surgical degree for obstetric operations, the danger is far below what it is in surgery.

4. No proof can be furnished that the parturient woman enjoys a special immunity from the dangers of anesthetics, though facts seem to indicate that such exists. Her best safeguard lies in the care and watchfulness of the administrator.

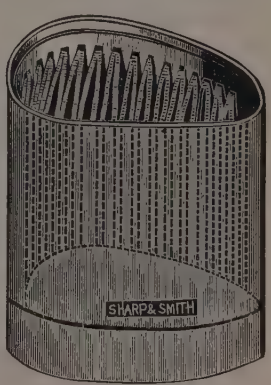


FIG. 155.—Allis' Ether Inhaler.

Rules for Administering Anesthetics.—The general rules for administering anesthetics are pretty well understood, even by tyros, and still there is frequent disregard of them. The mode of administering chloroform differs materially from that of ether. In bringing a patient under the influence of the latter, a cone, or an inhaler of some other form, is generally employed, which is held closely down over the nose and mouth, so that all the atmosphere which enters the lungs is loaded with ether vapors, taken from the saturated sponge in the apex of the cone. Such a use of chloroform would be dangerous in the extreme.

In the administration of chloroform the following rules should be observed:

First:—The patient must occupy the recumbent posture.

Second:—The article or apparatus by means of which the chloroform vapors are conveyed to the patient, must be so placed or arranged as not to exclude a free supply of atmospheric air.

Third:—Both respiration and pulse should be attentively observed from first to last.

It has been repeatedly demonstrated that deviation from a horizontal position augments the patient's danger. The

head should lie in a line with the longitudinal axis of the trunk.

The supply of atmospheric air must be more copious than that which is given with ether inhalation. A folded handkerchief, or napkin, is a convenient medium, on which should be poured but a small quantity at a time, and then placed within one-half or three-quarters of an inch of the patient's mouth and nose. Esmarch's inhaler is more convenient and economical than any other means. The patient should be directed to breathe deeply and regularly, while fear and excitement ought to be allayed as far as possible, by cheerful words and a calm bearing. The supply of chloroform may be renewed as often as circumstances seem to require, the intervals being varied to correspond with the woman's condition, and the facility with which anesthesia is produced. These are important considerations, since it is very certain that danger bears a marked relation to the intensity of the impression, and the rapidity of its production.

Neither anesthetic should be administered without the closest attention being directed to the pulse and respiration. When employed in normal labor for the purpose merely of dulling the sensibilities, this is hardly so essential, though it should not be forgotten that in other than midwifery cases, death has occurred, in quite a proportion of instances, at the very beginning of the anesthetic process. When carried to the extent of complete narcosis, the rule must be scrupulously adhered to, if one would keep within the bounds of comparative safety. Nor should these observations be intrusted to a person wholly unacquainted with the phenomena developed by anesthetics, if it is possible to secure the aid of one qualified to fill the position. To do otherwise is to subject the woman's life to unnecessary risk, one's self to much solicitude, and to merited denunciation in case of a fatal result.

After making the most elaborate provision for the administration of this powerful drug, the operator should on no account suffer himself to become oblivious to his patient's condition. When the operation is difficult, and attended with vexatious occurrences, one easily becomes so deeply engaged in the work immediately in hand as to remit his watchfulness over important concomitants—a state of mind against which he cannot be too guarded.

We shall not here enter into an account of the symptoms of

fatal cases, or the treatment to be adopted; but for an extended discussion of these we refer the student to elaborate works on surgery and to special treatises.

"Chloroform is especially indicated—

"1. In primiparæ who are nervous and excitable, and in whom the pain may even cause delirium; also in those with whom the labor is greatly prolonged, thus becoming a source of danger.

"2. In all cases in which there is a spasm, contraction, or rigidity of the neck or body of the uterus. Contra-indications are the absence of severe suffering, the existence of placenta prævia, general prostration, disease of the circulatory or respiratory organs, cerebral disease, alcoholism, etc."



FIG. 156.—Esmarch's Inhaler.

CHAPTER V.

THE MECHANISM OF LABOR.

The Various Positions of the Fœtus.—This is a subject which, to the student, is full of difficulty, and to elucidate it is no easy task. One of the most conspicuous factors in the production of confusion is the adoption of numerals to designate the various positions which are met. Most authors give to every presentation four positions, which are designated by the numbers one, two, three and four. For example, the left occipito-anterior position is the first, and the right occipito-anterior is the second. The adoption of these designations, it must be confessed, is a saving of some words at the moment; but to give the student a perspicuous and comprehensive view of the different positions, and their relations, demands an exhaustive, and, we may add, unnecessary effort.

As a preliminary to the study of this subject one must have a clear conception of the cardinal features of the pelvis, which have been elsewhere pointed out. With a knowledge of the form of the pelvic brim, outlet and cavity, the situation of the iliopectineal eminence and the acetabulum, and the relative measurements of the various diameters, and finally the boundaries of the false and the true pelvis, one is prepared to understand that which here follows.

THE THEORY OF CLASSIFICATION.—The four positions into which the various presentations are divided are based upon the theory that the long diameter of the presenting part occupies an oblique position with reference to the pelvis. That the theory does not hold true in all cases, is manifest to every obstetric practitioner. The long diameter is sometimes, though rarely, at the brim, in the conjugate of the pelvis; and again it occupies the transverse diameter. In the latter instance it always rotates into an oblique diameter, sooner or later, and therefore becomes one of the regular positions; while instances of the former are so rare as to make a single exception of no great importance. For practical as well as theoretical purposes, perspicuity would lead to an approval of the division.

When the vertex presents, the occiput is regarded as *the* cardinal feature, since it is in advance, and from the direction it assumes the positions are described, or numbered. With the

long diameter of the head in an oblique pelvic diameter, the occiput must be either forwards and to the left, or backwards and to the right; forwards and to the right, or backwards and to the left. When forwards and to the left it is the first position; when forwards and to the right it is the second position; when backwards and to the right it is the third position; and when backwards and to the left it is the fourth.

When the face presents, the chin corresponds, so far as the mechanism of labor is concerned, to the occiput in vertex presentation, and the direction of that part determines the position. When backwards and to the right it is the first position; when backwards and to the left, the second; when forwards and to the left, the third; and when forwards and to the right, the fourth.

When the pelvic extremity presents, one pole of the long diameter does not take precedence over the other, since it is immaterial to the easy and natural performance of the mechanism of labor whether the right or the left trochanter looks forwards. When the bi-trochanteric diameter is in the left oblique pelvic diameter, and the left hip is forwards and to the right, it is the first position; when in the right oblique diameter, and the right hip is forwards and to the left, it is the second position; when in the left oblique and the right hip is forwards and to the right, it is the third position; and when in the right oblique diameter, with the left hip forwards and to the left, it is the fourth position.

When the fœtus presents transversely, four positions may also be described. If the dorsum is forwards, and the head lies to the right, it is the first position; if the dorsum is forwards, and the head lies to the left, it is the second position; when the dorsum is backwards, and the head lies to the left, it is the third; and when the dorsum is backwards, and the head lies to the right, it is the fourth.

These are the four positions of the various presentations. They have been otherwise named by some authors.

The Basis of Classification.—It must not be supposed that the classification of positions is made upon mere arbitrary principles, though from the first study of it this may seem to be true. Our attention has thus far been addressed to the various features of the presenting parts, but we will now regard the position of the trunk.

With respect to the direction of the back, it should be said

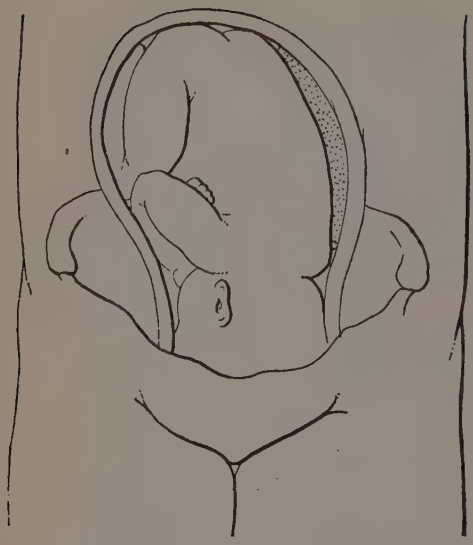


FIG. 157.—First position of the Vertex.

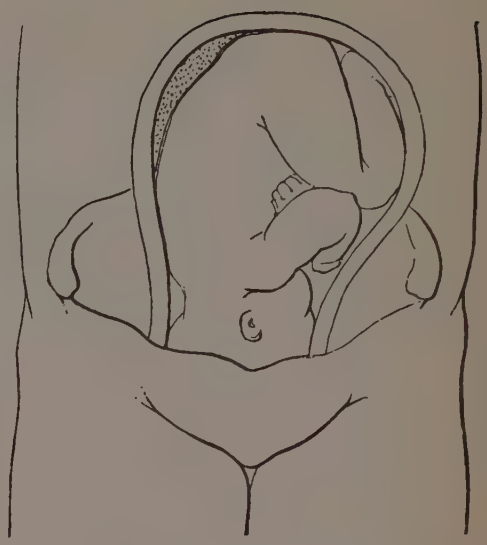


FIG. 158.—Second position of the Vertex.



FIG. 159.—Third position of the Vertex.



FIG. 160.—Fourth position of the Vertex.

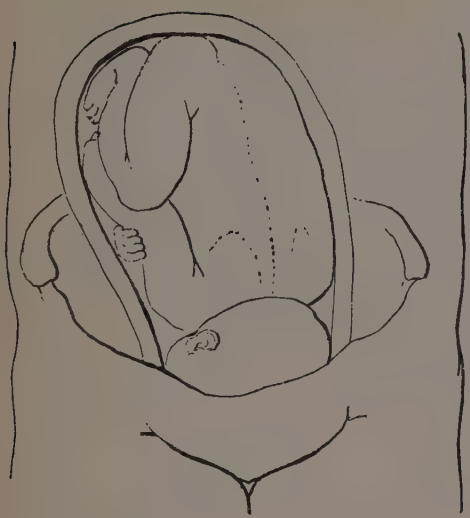


FIG. 161.—First position of the Face.

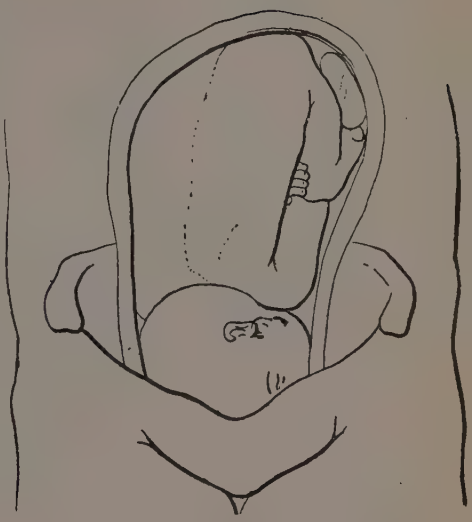


FIG. 162.—Second position of the Face.



FIG. 163.—Third position of the Face.



FIG. 164.—Fourth position of the Face.



FIG. 165.—First position of the Breech.



FIG. 166.—Second position of the Breech.



FIG. 167.—Third position of the Breech.



FIG. 168.—Fourth position of the Breech.

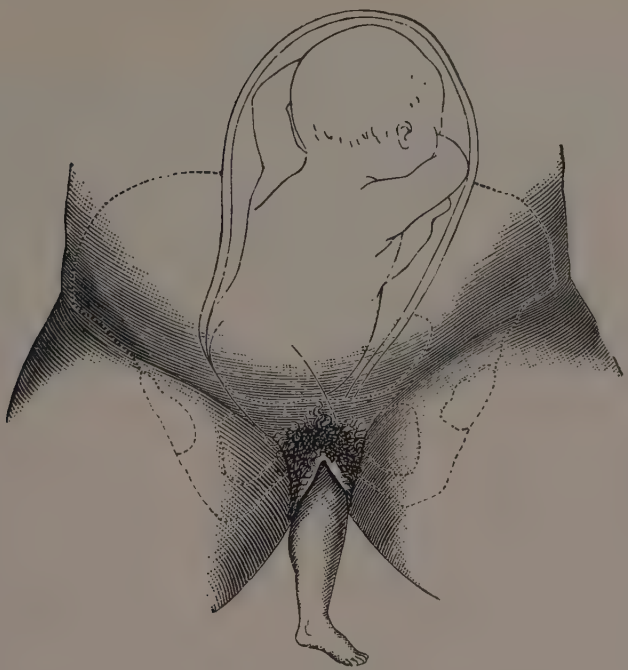


FIG. 169.—Second position of Footling presentation.



FIG. 170.—Fourth position of the Feet.



FIG. 171.—Third position of Transverse presentation.

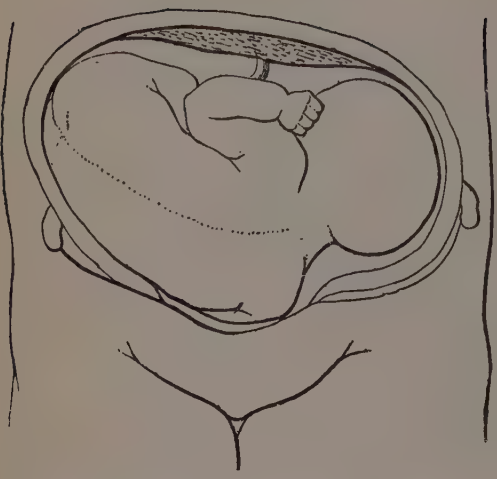


FIG. 172.—Second position of Transverse presentation.

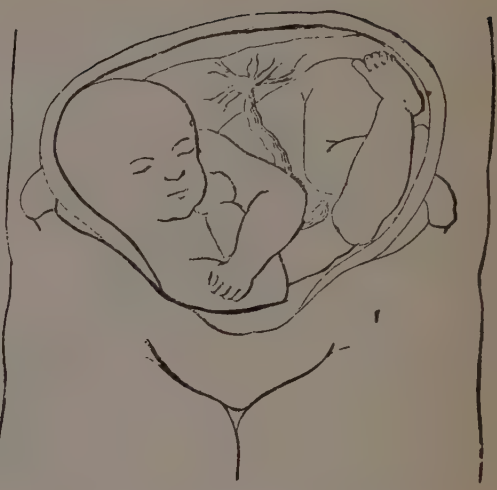


FIG. 173.—Fourth position of Transverse presentation.

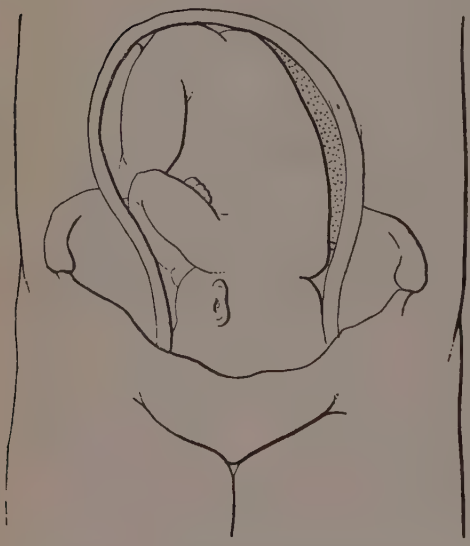


FIG. 174.—First position of the Vertex.



FIG. 175.—First position of the Breech.

that, like the position of the head, it is not always oblique; still, practical, as well as theoretical, purposes are just as well served —we may say, are better served—by assuming that it is. The long axis (bis-acromial) of the trunk forms a right angle with the long axis (occipito-frontal in vertex presentation, and fronto-mental in face) of the head. Accordingly we observe that the dorsum of the fœtus coincides with the occipital pole of the long diameter of the vertex, and the frontal pole of the long diameter of the face. The bi-trochanteric diameter of the pelvis is the long diameter of the presenting part, when the

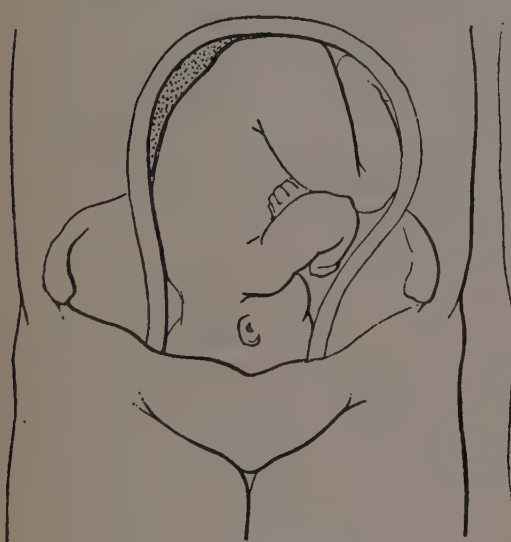


FIG. 176.—Second position of the Vertex.



FIG. 177.—Second position of the Breech.

pelvic end is in advance. In the first position of vertex presentation the occiput lies to the left ilio-pectineal eminence, and constitutes the left occipito-anterior position. Now, assuming, as we do, that the fœtal back corresponds in direction with the occiput, this position might well be designated the left dorso-anterior position of the vertex. Let us now reverse the ends and cause the breech to present in the first position, and we have the left dorso-anterior position of this presentation. We will now return the child to the first position of the vertex, and then by extension of the head, i. e., by tipping the head backwards, convert it into the first position of the face, and we find that this may likewise be described as the left dorso-ante-

rior position—not of the vertex, not of the breech—but of the face. Furthermore, we will now turn the head away from the brim and lay it in the right iliac fossa, and we have the first position of transverse presentation, which may also be designated the left dorso-anterior.

What is true of the first position is also true of the second, third and fourth positions. In the second position the dorsum of the fœtus is forwards and to the right, and it may be graphically described as right dorso-anterior. When the head presents, it is right dorso-anterior position of the vertex or face; when the pelvis presents, it is right dorso-anterior of the breech, knees or feet; and when the presentation is of the side of the fœtal oval, then it may still be designated the right dorso-anterior position. In the third position of *any* presentation, the back of the fœtus lies backwards and towards the woman's right, and in the fourth position of *any* presentation, the dorsum is turned backwards and towards the woman's left. By such generalization, we obtain a comprehensive view of the entire subject of positions.

From what has been given on this topic we may draw the following conclusions:

1st. That the underlying principle of classification is not so much the direction of the cardinal features of the presenting part, as the direction of the fœtal dorsum.

2d. That the first and second positions of all presentations are dorso-anterior,—the first, left dorso-anterior, and the second, right dorso-anterior; and the third and fourth positions are always dorso-posterior,—the third being right dorso-posterior, and the fourth, left dorso-posterior.

3d. That in the first and fourth positions of *all* presentations, the dorsum of the fœtus is directed towards the woman's left,—the first somewhat forwards, the fourth somewhat backwards; and in the second and third positions of *all* presentations, the dorsum is turned towards the mother's right,—the second, somewhat forwards, the third, somewhat backwards.

THE RELATIVE FREQUENCY OF POSITIONS.—Dubois found the first position in 70.83 per cent., and the third in 25.66 per cent. of all his cases. Dr. Joseph G. Swayne, on the contrary, out of 1,000 cases had the first position in 792 (79.2 per cent.), the second in 152 (15.2 per cent.), the third in 19 (1.9 per cent.), and the fourth in 37 (3.7 per cent.).

Out of 169 vertex presentations in our hospital practice,

there were 118 of first position, 35 of second, 7 of third and 9 of fourth.

Points of Coincidence Between the Various Positions.—*In vertex presentation*, the first and second positions agree in one particular, namely, they are both occipito-anterior positions,—the first looking to the left, the second to the right; and the third and fourth agree in being occipito-posterior positions,—the third directed towards the right, and the fourth towards the left. The first and fourth correspond in being left occipital positions; that is to say, the occiput in both instances is turned towards the left,—in the first, somewhat forwards, in the fourth, somewhat backwards. The second and third are alike in the general direction of the occiput,—both looking to the right,—the second turned somewhat forwards, and the third somewhat backwards. Again, the first and third agree in respect to the oblique pelvic diameter (right oblique) in which they lie, but the poles are reversed, so that the first is the left occipito-anterior position, and the third the right occipito-posterior. The second and fourth correspond in similar respects. They occupy the left oblique pelvic diameter,—the second being the right occipito-anterior, and the fourth the left occipito-posterior position.

Face Presentation.—Briefly stated, the positions of the face coincide in certain particulars which are determined by similar principles of classification as are those of the vertex. The first and second are mento-posterior positions, the chin in the first looking to the right, and in the second, to the left. The third and fourth are mento-anterior positions,—the chin in the third being directed to the left, and in the fourth, to the right. The first and fourth correspond in the lateral direction of the chin, —in the first it being backwards and to the right, and in the fourth, fowards and to the right. The coincidence between the second and third is similar,—in the second the direction being backwards to the left, and in the third forwards to the left.

The first and third and the second and fourth are alike in the pelvic diameters occupied by the long facial diameter,—the first being right mento-posterior, and the third, left mento-anterior; while the second is left mento-posterior, and the fourth right mento-anterior.

Breech Presentation.—The first and second positions of the breech agree in that the right trochanter of the fœtus looks towards the left, in the first position somewhat backwards, and

in the second forwards. Likewise the third and fourth positions resemble one another in that the right trochanter is turned to the mother's right,—in the third position it being forwards, and in the fourth backwards. The first and third are identical in the direction of the bi-trochanteric diameter (left oblique), but in the first position the right trochanter is at the left ilio-sacral synchondrosis, and in the third is at the right ilio-pectineal eminence. The second and fourth positions coincide in the pelvic diameter occupied (right oblique), but in the second the right trochanter is at the left ilio-pectineal eminence, and in the fourth, at the right ilio-sacral synchondrosis.

CHAPTER VI.

THE MECHANISM OF LABOR—Continued.

The mechanism of labor varies greatly with the character of the presentation. The varieties of these, and their positions, have already received attention, and but a few general remarks with regard to them need here be made. Vertex presentation represents the normal type of labor, and is alone entitled to be regarded as strictly normal. The other varieties are relatively infrequent, and present characters which deviate from the phenomena usually observed.

Vertex Presentations.—Some of the ancients believed that the head passed through the pelvis in the same manner as a semi-organized clot of blood, or a mass of hardened fæces, without reference to those nice laws of flexion, rotation, extension and restitution, now so well understood to have an important bearing in every case. Others believed that the child by its own spontaneous efforts pushed its way through the pelvis—that it verily crept into the world. The origin of the present theories regarding the mechanism of labor may be traced to Sir Fielding Ould, who in 1742 published a work which contained some of the ideas still extant. In 1771, Saxtorph, of Copenhagen, and Solayres de Renhac, of Montpellier, simultaneously, and without mutual consultation or knowledge, published essays which agreed that in natural labor the long diameter of the child's head enters the pelvis in an oblique direction, and that in a large proportion of instances it occupies the right-oblique diameter, the poles of which are the left ilio-pectineal eminence and the right ilio-sacral synchondrosis. Through the strong advocacy of Baudelocque these ideas were quite generally accepted, but certain erroneous notions crept in, and the matter was finally cleared up and simplified by Naegele, of Heidelberg, in 1818.

"VERTEX."—The term "vertex" will be understood to signify the upper surface of the head, but it may be well to say that by it is meant the crown, or that part of the head embraced within the limits of lines connecting the posterior fontanelle, the parietal eminences, and the anterior fontanelle.

RELATIVE FREQUENCY OF VERTEX PRESENTATIONS.—Out of 93,871 births collected by Spiegelberg, from private practice, in

over ninety-seven per cent. the vertex presented. Dubois, in 2,020 deliveries at term, found 1,913 vertex presentations. Mme. Boivin in 20,517 births, found 19,810 vertex presentations. The probable cause of this has already been considered.

Relative Frequency of First Position.—As elsewhere stated, the first position of the vertex is found in a large proportion of cases. The cause of this is not perfectly understood, but Simpson attributes it to the presence of the rectum on the left side of the pelvic brim.

It has been suggested that it probably results from the fact that the uterus is usually rotated in such a way upon the spine, that the right side inclines obliquely backwards, while the left side is turned somewhat towards the front.

Changes of Presentations and Positions.—The fœtus may change its presentation and position at any time during pregnancy, but, of course, with less facility in the latter part of this period. Not rarely does such a change take place even after the beginning of labor, whether remedies have been administered with a view to effect a change or not.

From extensive observations made by him, Schrœder arrived at the following conclusions:

1st. The fœtal presentation rarely remains motionless from the end of the seventh or the eighth month until the time of labor. In 113 women examined once only, change of presentation was encountered in 31.86 per cent. of the cases. Primiparæ 30 per cent.; multiparæ 36.36 per cent. In 56 women examined twice, change of presentation occurred in 59 per cent. of the cases. Primiparæ 52 per cent.; multiparæ 66 per cent. In 33 women examined three times, change of presentation was found in 76 per cent. of the cases. Primiparæ 72 per cent.; multiparæ 88.9 per cent. In 28 women examined several times, change of presentation was found in 89.3 per cent. of the cases. Primiparæ 89.3 per cent.; multiparæ 100 per cent.

2d. The changes are less common in primiparæ than in multiparæ.

3d. They become rarer as we approach term.

4th. Even when the head is fixed in the superior strait, change of presentation is possible.

5th. When the head is completely within the lesser pelvis, change of position occurs in only 10 per cent. of the cases.

6th. Changes are more common with contracted than with normal pelves.

The following table, taken from Schrœder, will show the frequency and variety of these changes of presentations and of positions:

Presentations and Positions.							All cases. Times.	Primiparæ. Times.	Multiparæ. Times.
1st position of Vertex	into	2d position of Vertex					50	33	17
1st "	"	"	2d	"	Breech		2	1	1
1st "	"	"	1st	"	Shoulder		3	2	1
1st "	"	"	2d	"	"		2	1	1
2d "	"	"	1st	"	Vertex		71	43	28
2d "	"	"	1st	"	Breech		1	0	1
2d "	"	"	2d	"	"		3	2	1
2d "	"	"	1st	"	Shoulder		5	3	2
3d "	"	"	2d	"	"		1	0	1
1st "	Breech	"	1st	"	Vertex		3	1	2
2d "	"	"	1st	"	Face		1	0	1
2d "	"	"	1st	"	Vertex		9	3	6
2d "	"	"	2d	"	"		3	0	3
2d "	"	"	2d	"	Shoulder		2	0	2
1st "	Face	"	1st	"	Vertex		1	0	1
2d "	"	"	2d	"	"		1	0	1
1st "	Shoulder	"	1st	"	"		4	1	3
1st "	"	"	2d	"	"		7	4	3
1st "	"	"	2d	"	Shoulder		2	0	2
2d "	"	"	1st	"	Vertex		4	2	2
2d "	"	"	2d	"	"		5	0	5
Unknown	Shoulder	"	2d	"	"		2	2	0
"	"	"	2d	"	Breech		1	0	1

Conditions at the Beginning of Labor.—At the beginning of labor, the presenting head, covered by the uterine tissues, is usually found just above the brim, and occupies with its long diameter an oblique diameter of the pelvis.

Conditions of the Fœtus which Favor Expulsion.—The mechanism of labor in vertex presentations is usually described as consisting of a series of movements, termed (1) descent, (2) flexion, (3) rotation, (4) extension, (5) restitution.

A knowledge of these movements as they occur in labor is highly essential to a proper comprehension of the mechanism of parturition, and the intelligent practice of the obstetric art.

MECHANISM OF LABOR IN THE FIRST, OR LEFT OCCIPITO-ANTERIOR, POSITION.—It should be remembered that, in the first position of the vertex, the long diameter of the head occupies the right oblique diameter of the pelvis, the occiput being directed to the left iliopectineal eminence, and the forehead to the right sacro-iliac synchondrosis. The dorsum of the fœtus is thus brought to the mother's left side.

Parallelism of the Bi-parietal Plane to the Plane of the Brim.—The head has usually been described as entering the brim with the right parietal eminence on a lower plane than the left; but this idea is being abandoned. The plane of the brim and the bi-parietal plane are probably at that stage of advancement coincident.

Descent and Flexion.—Descent and flexion are closely allied movements. As the head descends and encounters the boundaries of the brim, the force is such as to cause flexion. The long diameter of the head represents a lever, with the fulcrum at the occipito-atlantoid articulation, the anterior being the long arm and the posterior the short. It is clear, then, that, as the head descends and meets resistance at the brim, the force transmitted through the spine will cause descent of the occiput, and effect flexion of the chin on the sternum. The degree of flexion will be proportioned to the extent of the action, and the force and extent of resistance encountered.

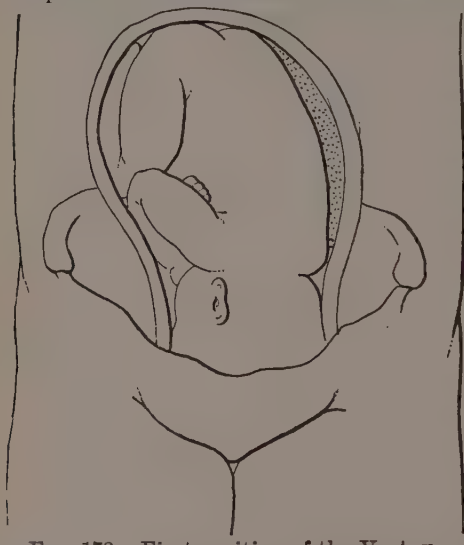


FIG. 178.—First position of the Vertex.

Direct Descent of the Head.—The descent of the head does not, in the early part of its course, closely follow the axis of the pelvic canal; but the movement is directly downwards and backwards in the axis of the brim, until it touches the floor of the pelvis, and meets there with resistance which turns it forwards to the pubic arch.

Passage Through the Pelvic Cavity.—As the head passes through the cervix uteri, flexion usually becomes extensive, so that the chin is pressed well upon the sternum. This movement not always being requisite, does not always occur, the exception being found in a small head, or an exceptionally soft and dilatable cervix. The advantage of this condition of flexion is plain, since it will be seen that by means of it shorter diameters are brought to bear upon the pelvic dimensions.

A further advantage derived from head flexion has been described by Pajot: "The fœtus in its entirety may be regarded as a broken, vacillating rod, which is movable at the articulation of the head and trunk, but a solid thus disposed presents conditions unfavorable to the transmission of a force acting principally upon one of its extremities; it follows, therefore, that, previous to flexion, the uterine action, pressing upon the pelvic extremity to promote the advance of the fœtus, is lost in great measure in its passage from the trunk to the head, by reason of the mobility of the latter; but the cephalic extremity, once fixed upon the thorax, is most advantageously disposed to participate in the impulse communicated to the general mass of the fœtus."

The head, having accomplished the movement of direct descent, and having cleared itself from the trammels of the cervix uteri, becomes again somewhat extended. But, as it thus presses on the smooth pelvic floor, the occiput very naturally glides in the direction of least resistance, flexion is again firm, and *rotation of the head* occurs, by means of which its long diameter moves from the right oblique to the conjugate diameter of the pelvis, and the occiput slips under the pubic arch.

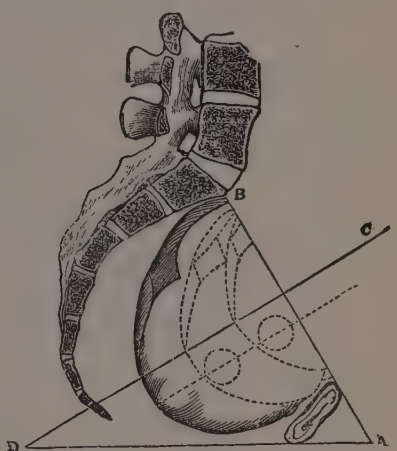


FIG. 179.—Showing the lateral obliquity of the Head with reference to the horizon, in the pelvic cavity in the first position.

The spines of the ischia have been said to act an important part in rotation, but we are inclined to deny them the title of "key to the mechanism of labor." Since it is always the most dependent part which rotates to the front, a moment's reflection will enable us to see that rotation, therefore, takes place in such a direction that the sloping surface of the fœtal head corresponds with the incline of the perineum.

The law which controls the movement known as "rotation" is based upon the mechanical principle that, when a body is subjected to unequal pressure, its movement will always be in the direction of least resistance. Rotation is not always com-

plete, the long diameter of the head still preserving some of its original obliquity.

At the outlet there may be a certain amount of bi-parietal obliquity to the vulvar plane, and accordingly the right parietal eminence is born in advance of the left. The question of synclitism of bi-parietal and pelvic planes merits but little study from any other than the specialist.

Passage of the Head Through the Outlet.—Flexion at this part of labor should be firm, so as to bring the shorter diameters of the head into the strait. At the same time the occiput glides under the pubic arch, and becomes the center of another movement which is now begun, namely, extension. The occiput being fixed under the arch, is prevented, by the nape of the neck, from further advance, and the direction of least resistance is changed, so that now the perineum is distended, and by the movement of extension alluded to, the head passes the vulva.



FIG. 180.—*O B*, short arm of head lever. *B F*, long arm of head lever.

Restitution, or External Rotation.—After birth of the head, a movement of accommodation, known as restitution, or external rotation, takes place, which is nothing more than the face turning in this case to the mother's right thigh. The change is effected mainly in deference to the shoulders, which are yet to be delivered, the long, or bisacromial, diameter of which now seeks the pelvic conjugate. This is an important movement. The long diameter of the vertex, and the long diameter of the shoulders, naturally assume directions at right angles to each other. In the first position, the vertex lies with its long axis in the right oblique diameter of the pelvis, and the bisacromial axis in a converse direction. During rotation of the head in the pelvic cavity, the position of the shoulders does not materially change, and after the head escapes, it forsakes

its constrained position, and is restored to its original, or, at least, its recent direction,—hence the name of the movement,—restitution. But this does not complete the movement, for, no sooner has the head fairly escaped than the shoulders begin to adjust themselves to the outlet by turning their long diameter into the conjugate, and as this change occurs, the head is still further rotated, until the face looks pretty squarely to the mother's right thigh.

While these are the usual phenomena, others are sometimes



FIG. 181.—External rotation of the Head.

observed to substitute them. It would occasionally appear that rotation of the shoulders does take place simultaneously with that of the head, in which case the bisacromial diameter comes to lie at the brim, or in the cavity, in a transverse direction, and when the shoulders rotate, preparatory to escape from the outlet, it pursues the usual direction, and, as a result, the face is observed to turn towards the mother's left thigh. The author has seen many marked instances of this anomalous movement.

The term restitution has by some been limited to the first

part of the external movement, while the balance is called external rotation. The term external rotation may properly be

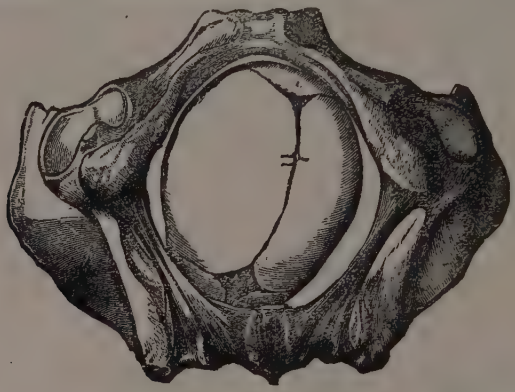


FIG. 182.—The Head approaching the outlet in the first position.

applied also to the anomalous movement just described, which is not strictly restitution.

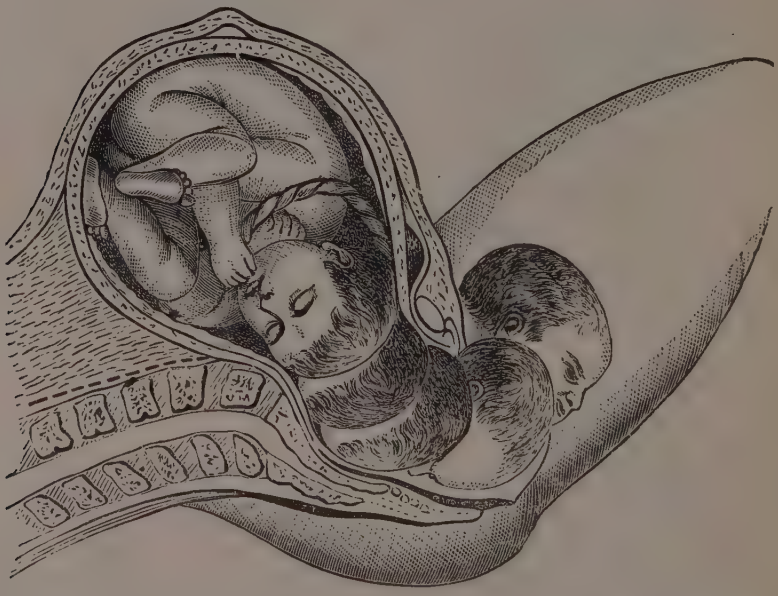


FIG. 183.—Illustrating the various movements of the Head in the first position of the Vertex.

EXPULSION OF THE TRUNK.—After birth of the head there is generally a rest, and upon the renewal of pain, the right shoulder is directed forwards by the right anterior ischial plane,

while the left glides backwards over the left posterior plane, into the sacral hollow. This movement is often quite sudden, and is accomplished only as the part actually passes the vulva, which it must do with a spiral motion. The body is bent upon itself, and the left shoulder is driven downwards until it shows at the posterior commissure, when the right slips under the pubic arch, and finally both emerge almost simultaneously.

If the arms are flexed, the elbows pass with a jerk, and sometimes produce laceration of the perineum. The trunk easily follows the shoulders, and the entire body is speedily born.

MECHANISM OF THE SECOND, OR RIGHT OCCIPITO-ANTERIOR, POSITION. — In the second position of the vertex the long diameter lies in the left oblique diameter of the pelvis, and the occiput looks forwards and to the right ilio-pectineal eminence, or acetabulum, and the forehead towards the left ilio-sacral synchondrosis. The same general movements are performed, namely, descent, flexion, rotation, extension, and restitution; but the directions are changed from right to left, instead of left to right, and external rotation takes place by the face turning towards the mother's left thigh, instead of her right. The left shoulder rotates from the left side to the pubic arch, whereas, in the first position, the right shoulder rotates from the right side forwards. Further material differences than these do not exist, and we accordingly omit a detailed description of the mechanism of this position.

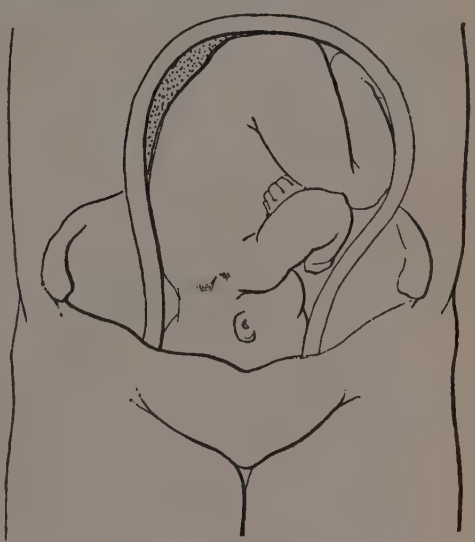


FIG. 184.—Second position of the Vertex.

MECHANISM OF THE OCCIPITO-POSTERIOR POSITIONS. — The occipito-posterior positions are the third and fourth, in the former of which the occiput lies towards the right ilio-sacral synchondrosis, and in the latter to the left ilio-sacral synchondrosis. The third position occupies the same oblique diameter

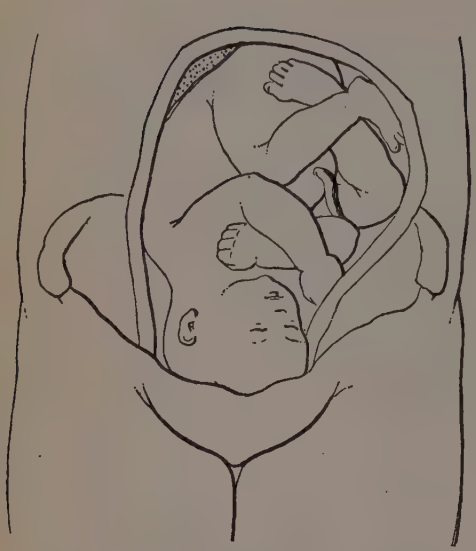


FIG. 185.—Third position of the Vertex.



FIG. 186.—Fourth position of the Vertex.

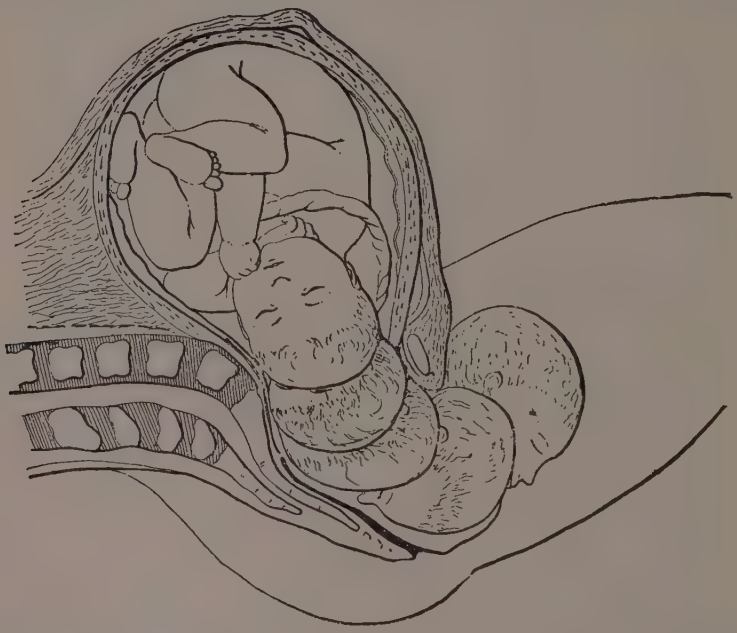


FIG. 187.—Showing proper rotation of the Head in the fourth position of the Vertex.

as the first, and the fourth the same diameter as the second, but the poles are reversed. What creates particular interest in connection with these positions is the necessarily extensive rotation by which the occiput is brought to the pubic arch. In occipito-anterior positions, the rotation is short and easily accomplished, while in occipito-posterior positions it is long and difficult, the occiput sweeping around two-fifths of the circumference of the pelvic circle. Anomalous rotation occasionally takes place, in which case the occiput is thrown backwards against the perineum. Such a case as that to which we have just adverted, wherein the occiput persists in maintaining a backward direction, is more difficult and dangerous than an occipito-anterior termination, because the head has to be subjected to greater moulding, and, even then, its longer diameters are involved at the outlet. The occiput in such a case, after much effort, slips through the vulva, and rests upon the perineum, upon which, as a pivot, the head rotates in the movement of extension, until it ultimately passes. The movements described as taking place in the first position occur here also. Flexion is, or should be, firm; rotation should take place as described; extension is observed at the vulva, and restitution occurs after head expulsion.

When rotation is properly accomplished, the third becomes, as stated, the second, and the fourth, the first; from which point onwards their movements are identical. When labor terminates in an occipito-posterior position, the face of the child turns, in restitution, in the third position towards the mother's left thigh, and in the fourth, towards the right thigh.

With regard to the causes which determine rotation forward of the occiput, the following experiments of Dubois will be instructive: "In a woman who had died a short time before in childbed, the uterus, which had remained flaccid, and of large size, was opened to the cervical orifice, and held by aids in a suitable position above the superior strait; the fœtus of the woman was then placed in the soft and dilated uterine orifice in the right occipito-posterior position. Several pupil-midwives, pushing the fœtus from above, readily caused it to enter the cavity of the pelvis; much greater effort was needed to make the head travel over the perineum and clear the vulva; but it was not without astonishment that we saw, in three successive attempts, that when the head had traversed the external genital organs, the occiput had turned to the right anterior posi-

tion, while the face had turned to the left and to the rear; in a word, rotation had taken place as in natural labor. We repeated the experiment a fourth time, but as the head cleared the vulva the occiput remained posterior. Then we took a dead-born fœtus of the previous night, but of much larger size than the preceding; we placed it in the same conditions as the first, and twice in succession witnessed the head clear the vulva after having executed the movement of rotation. Upon the third and following essays, delivery was accomplished without

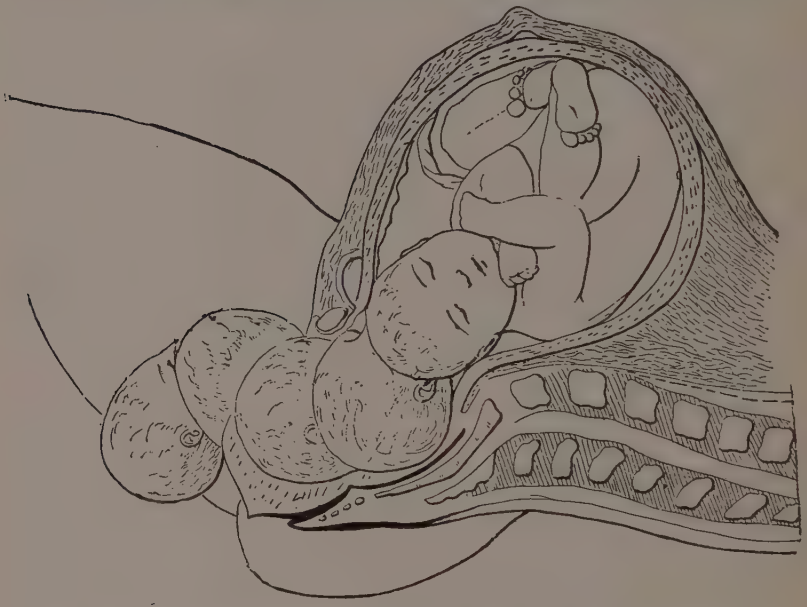


FIG. 188.—Occipito-posterior termination of the third position of the Vertex.

the occurrence of rotation; thus the movement only ceased after the perineum and vulva had lost the resistance which had made it necessary, or, at least, had been the provoking cause of its accomplishment."

High Rotation.—"Rotation," says Leishman, very truly, "at an early stage of labor, before it is yet practicable to ascertain the actual position of the head with anything like certainty, is probably of much more frequent occurrence than we have any idea of. Few things are more familiar to the experienced accoucheur than a rotary or rolling movement of the head, which he observes either during a pain or an interval,

while it is still high in the pelvis. This is due partly to uterine action, and partly to the movements of the fœtus, and we have no doubt that, by this means, many unnatural and faulty positions are rectified even after labor has commenced; and we are further entitled to assume that in this way many occipito-posterior positions are rectified at such a stage that their detection is rendered impossible. It should always be remembered that the dorso, or occipito-anterior, position of the child is the natural one, and that according to which the irregular oval which it forms is most conveniently disposed."

Conversion of Occipito-posterior into Occipito-anterior Positions.—A very important question of treatment may not inappropriately be here considered, namely, the possibility, practicability, and advisability of converting occipito-posterior into occipito-anterior positions. The experience of ourselves, as well as others, thoroughly convinces us of the possibility of so doing. Whether, in all cases, it is advisable so to do is another matter. We believe, however, that when the head is still free above the superior strait it may nearly always be accomplished by manipulation of the suitable kind. But sometimes, in order to accomplish it, the effort involves a certain amount of risk to the woman, which it is not always advisable to incur.

Smellie, more than a century ago, executed such a change in a difficult case, and thereby accomplished a result which "gave him great joy." The feasibility of the operation is advocated by a goodly number of obstetricians of to-day. It is not an operation, however, which can be performed at every stage of labor, but the possibility of its successful execution is limited to two periods, namely, that of early labor, when the head is still free above the pelvic brim, and that part of the second stage, when the advancing occiput presses firmly on the pelvic floor. At no other time should it be attempted. Attention to the ordinary movements of the head will sometimes obviate any necessity for interference. In the process of descent there is sometimes manifested a tendency of the chin to leave the sternum, and the head to become extended. To allow this condition to persist, is to preclude the possibility of rotation forward of the occiput by the natural forces; while to enforce flexion is the only thing required to secure the desired end. In other cases, two fingers under the occiput, and slight traction in an anterior or lateral direction, during, as well as between pains, will bring about rotation.

But again, while the head still lies above the brim, or but loosely engaged, it is deemed advisable to effect rotation. That being true, the forceps may be used, or not. Dr. Jno. S. Parry is a strong advocate of manual rotation in these positions. He recommends the introduction of the well-oiled hand into the vagina, and the fingers through the os uteri. The head is then grasped as firmly as possible, and rotation effected, while with the opposite hand, by external manipulation, the body is turned on its longitudinal axis. The range of applicability of such treatment should be left to the good judgment of each individual practitioner, as we are not prepared to commend so radical treatment as a routine practice.

Scanzoni's Method of Changing Cranial Positions.—Dr. Aly, in presenting this subject before the Obstetrical Society at Hamburg, recently, contended that abuse of the operation brought it into discredit. He was of the opinion that a very valuable method was being neglected, and, that in using it, Scanzoni's conditions and indications must be strictly observed. These are—1. The operator must make an exact diagnosis of the position of the head. 2. The head must be deep in the pelvis and be well grasped by the forceps, with proper respect to any anomaly of the pelvis. 3. The mother or child must be in danger. This operation of Scanzoni consists in seizing the head with a pair of straight forceps, and effecting forcible rotation far enough to bring the occiput somewhat forward. Among German authors, Winckel does not mention it in his text-book; Spiegelberg warns against it, and Schroeder advised waiting till the head rotated, or extracting with the occiput posteriorly. In the discussion following, Dr. Lomer vehemently opposed the use of the forceps as an instrument for rotating the head. He had seen a healthy young woman lose her life in consequence of it. The very fact that all modern obstetrical teaching opposed it, showed that others had experienced similar results. When a large head is fixed in the pelvis, the amniotic fluid having escaped, the head becomes moulded and conforms to the shape of the pelvis; rotation of the head with the forceps, under these conditions, will either fail or be attended with severe injury to the mother. If extracted without rotation, the most severe maternal injury will be a deep perineal laceration. If the head be small or the pelvis large, the head can be brought down to the floor of the pelvis in the ordinary manner with the forceps. It will then

almost always rotate. If it should fail, Ritgen's method is to be employed. Prof. Olshausen expressed the opinion that only those possessing exceptional skill should attempt the method. He remarked that introduction of a single blade and using it generally as a lever, was often sufficient to rotate the head.

We give this subject further consideration in the chapter treating of the use of the forceps in occipito-posterior positions.

CAPUT SUCCEDANEUM.—This is the name of a swelling which forms on the fœtal head during labor, resulting from effusion of serum or blood, or both, into the cranial coverings, or facial tissues. It does not form on the head of a dead child.

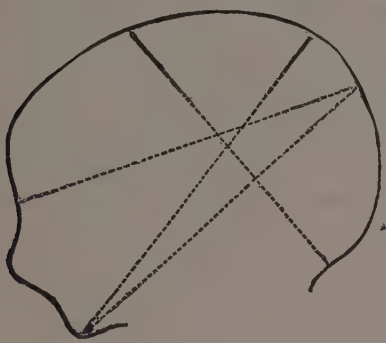


FIG. 189.—Outline of fœtal Head after an ordinary labor.—Vertex presentation.

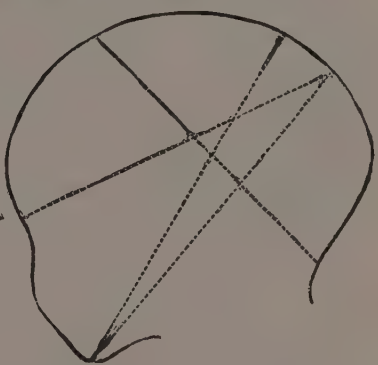


FIG. 190.—Outline of Head four days after birth.

It develops on that part of the head that is subjected to the least pressure, and hence, at first, within the circle of the os uteri. As labor advances, the area is extended, and more or less modified. Development is most marked as the head is being driven through the pelvic canal. In the first and fourth positions it is found on the right, and in the second and third positions, on the left parietal bone. In occipito-anterior positions it is located more posteriorly than in occipito-posterior positions, owing to the shifted area of cranial exposure to diminished resistance; while in face presentation it distorts and deforms the countenance.

CONFIGURATIONS OF THE HEAD IN VERTEX PRESENTATION.—Since the cranium of the fœtus is constructed of a number of bones, so articulated as to be capable of overlapping and moving under pressure, it follows that, in a close labor, this part undergoes a considerable amount of moulding, by means

of which its respective diameters are greatly modified. The smaller the parturient canal, the more difficult the labor,—the more extensive the change.

The most important modification is diminution of the sub-occipito-bregmatic, the occipito-frontal and the bi-temporal diameters, with elongation of what is generally regarded as the occipito-mental diameter, but which is, more accurately, the diameter represented by a line drawn from the end of the chin to a point on the vertex between the anterior and posterior fontanelles, nearer the latter than the former.



FIG. 191.—Form of the Head in Vertex presentation, after difficult labor.

Under pressure the frontal and the occipital bones are depressed and slide beneath the parietal bones, while at the same time one parietal bone overlaps the other. Moreover, the parietal bones themselves are somewhat changed in form, the cranial being curved at the point in front of the posterior fontanelle, hereinbefore alluded to, the sharpness of the curve being determined by the closeness of the labor, or, in other words, by the amount of compression exerted. When the head passes the outlet in an occipito-posterior position, the changes noted are still more marked.

The outline of the head is further changed by the formation of the caput succedaneum.

We may here add that the long-drawn-out appearance of the head which has been subjected to extreme moulding to make it conformable to the calibre of the parturient canal, in general soon passes away without the adoption of any special treatment to correct it; but the change may be somewhat accelerated, and, perhaps, rendered more pronounced, by gentle pressure upon the poles of the occipito-frontal diameter with the palms of the hands.

DIAGNOSIS OF POSITION, ETC.—This subject has been discussed in another place, and does not here require mention.

CHAPTER VII.

THE MECHANISM OF LABOR.—Continued.

Face Presentations.—The face constitutes the presenting part, according to Hodge, once in about 250 cases, according to Spiegelberg, once in 324 cases; according to Churchill, once in 231 cases; according to LaChapelle, once in 217 cases; and according to Depaul once in 175 cases.

Character of Labor.—Labor in connection with face presentation, while it may, in quite a proportion of instances, be terminated by the natural efforts, is generally far more tedious and difficult than in vertex presentations, and often presents complications of a most formidable nature. This is particularly true, as will later be seen, in connection with mento-posterior positions. For these reasons, and the additional fact that it is a presentation in which the dangers to both mother and child are considerably increased, we have thought best to adopt the classification which places it among abnormal presentations.

Causes.—There seems to be but little doubt that face presentations are most commonly transformed vertex presentations. The movement by which the latter are converted into the former consists only in extension, and a variety of causes may operate to effect the change. Hecker attributes many cases of face presentation to unusual length of the head, and the theory appears to be a plausible one. Other causes of extension are set down, as enlargement of the thyroid gland, increased size of the chest preventing sufficient flexion of the head, contraction of the pelvic brim, and unusual mobility of the fœtus owing to its small dimensions. Winckel says that thirty-three different causes have been suggested.

Lateral obliquity of the fœtus and long uterine axis, is supposed by many to be an important factor in the etiology of these presentations. Uterine action presses the head against the lateral boundary of the pelvic brim, and, favored by direction of the occiput towards the side of the uterine deviation, tilts it backwards. Such a movement would be favored by dolichocephalia, as suggested by Hecker. When once extension passes the line of equipoise, the presentation becomes permanently established. Proper flexion of the head is sometimes prevented by the presence of a prolapsed extremity which en-

croaches on the pelvic space, and tends at last to displace the vertex from the pelvic brim.

RELATIVE FREQUENCY OF POSITIONS.—Statistics are not yet sufficiently numerous to settle the question of the relative frequency of the various positions. There is doubtless but little difference in point of frequency between left and right dorsal positions. Naegele considered the first as the most frequent, in the ratio of twenty-two to seventeen. Tyler Smith said that the third and fourth facial positions are so extremely rare as hardly to be worth enumerating. There is, however, quite a lack of harmony among obstetric writers, for Leishman and others proclaim the fourth position as the most frequent, while Charpentier unites with Naegele in putting L. M. A. in advance. It is by no means rare for the face to enter the pelvis with its long diameter lying transversely.

MECHANISM OF THE FIRST POSITION OF THE FACE.—In the first position of the face the occipito-mental diameter lies in the right oblique of the pelvis, and the chin is directed to the right sacro-iliac synchondrosis.

For descriptive purposes we may divide the mechanism of face presentations into the movements which follow:

First movements,—descent and extension.

Second movement,—rotation.

Third movement,—flexion.

Fourth movements,—restitution and external rotation.

These we shall proceed to consider in the order of their occurrence in the first, or right mento-posterior, position.

Descent and Extension.—These two movements, because of their almost simultaneous occurrence, are here described together, as were descent and flexion in vertex presentations. So far as the mechanism of labor is concerned, the chin in face presentation corresponds to the occiput in vertex presentation, and hence, in well marked instances of the former, we find the chin sinking lower and lower in the cavity, thereby greatly augmenting cephalic extension. The degree of extension is ascertained by the relative situation of the chin and anterior fontanelle, both of which can sometimes be reached. The head engages the superior strait against mechanical disadvantages, and hence slowly. The degree of descent which can be accomplished with some degree of facility is determined by the length of the child's neck, unless the thorax and shoulders chance to be small enough to pass into the pelvic cavity.

The chin maintains its advanced position, owing to a mechanism similar to that which causes the occiput to take the most advanced position in vertex presentation. The fronto-mental diameter represents a lever with the short arm on the mental side, and the long arm on the frontal side. Propulsive force is applied from above, and of course the short arm is forced downwards.

Rotation.—The exact amount of descent which the length of the neck will permit in these cases, depends upon circumstances.

Observation teaches that, in most cases, the shoulders do not reach the brim, and engage it, until after the face



FIG. 192.—Face presentation at the outlet,—mento-posterior position.

presses on the perineum. Farther descent is impeded, and rotation forward of the chin seems to be a necessity. In nearly all cases the movement does take place in a natural manner, and menacing dangers are thereby averted. The chin in face presentations, and the occiput in vertex presentations, in the movement of rotation, act in obedience to a similar mechanism. The chin, being in advance, first comes in contact with resistance at the pelvic floor, and acting under the well-known law of mechanics that a body subjected to varied degrees of pressure moves in the direction of least pressure, turns forwards, while the cranial vault seeks the pelvic floor.

In the course of rotation there is a complete change of position, the first becoming the fourth. By means of rotation the

chin is brought to the pubic arch, and expulsion thereby facilitated.

Abnormal Mechanism.—In a small percentage of cases, the chin, instead of pushing forwards to the pubic arch, moves backwards into the sacral hollow, and labor terminates as represented in figure 198. The effect of this is excessive stretching of the neck of the fœtus and vulvar structures of the woman. Unless the child prove to be relatively small, labor can scarcely be determined without artificial aid.

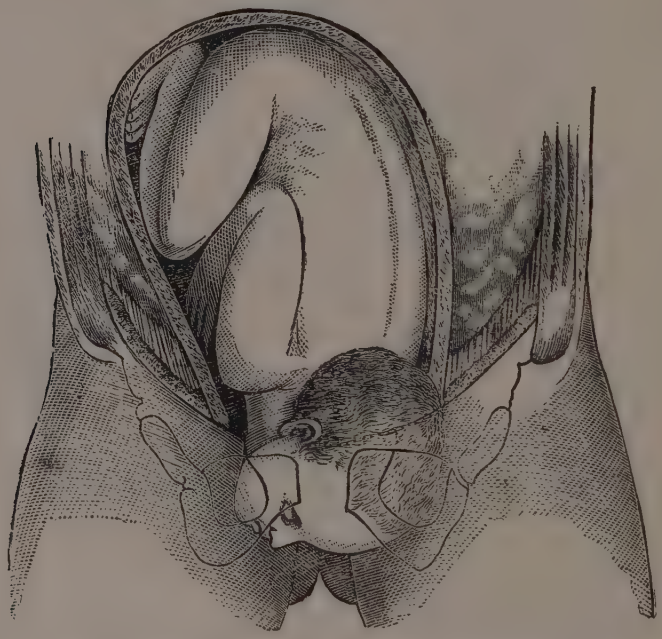


FIG. 193.—Engagement of the Head in face presentation. (Tarnier et Chantreuil.)

The depth of the pelvis posteriorly, and the added length of the perineum, will not admit of descent of the chin over the posterior vulvar commissure without a surprising amount of cranial flattening, and entrance of the thorax to a certain extent into the pelvic cavity. Cases have occurred in which, from unusual smallness of the head, distension of the sacro-sciatic ligaments has permitted flexion to take place, and delivery thus spontaneously to be effected.

Flexion.—In face presentation, with the chin to the pubic arch, the movement by which the head passes the vulva is one

of flexion. The chin engages under the pubic arch and remains fixed, while the forehead, vertex and occiput, successively sweep over the distended perineum.

Restitution.—Then occurs the final movement, that of restitution, or external rotation, the face in the first position turning towards the mother's right thigh. The shoulders follow, and expulsion is speedily accomplished.

FORM OF THE CRANIUM IN FACE PRESENTATION.—As a result of excessive compression of the head in so unnatural a position, the cranial vault is considerably flattened. The trans-

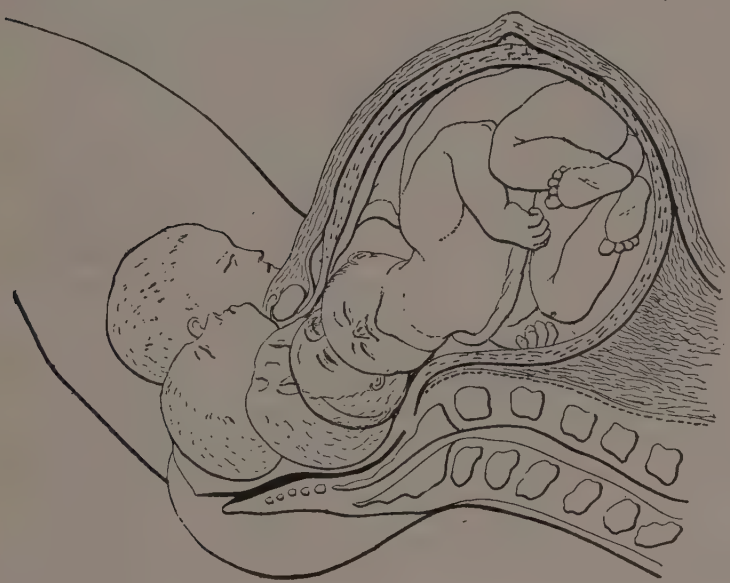


FIG. 194.—Showing proper rotation of the Head in the second position of the face.

verse, the occipito-frontal, and especially the occipito-mental diameters, are consequently increased, while the sub-occipito-bregmatic is diminished. Tumefaction of the presenting area is liable to be excessive, so that the fœtal countenance immediately after birth presents an appearance scarcely human. Swelling is greatest in the malar region, because the early presenting area is usually found within it.

PROGNOSIS.—We have before alluded to the augmented danger to both mother and child in this variety of presentation. Winckel gives the mortality of the fœtuses in face presentation at thirteen per cent., and Parvin at fifteen. Mortality

of the mothers is at least two or three fold that associated with vertex presentation. The average duration of labor exceeds that in vertex presentation, while protraction is attended with more dangerous consequences, and demands, with greater urgency and frequency the aid of obstetric resources.

THE SECOND POSITION.—The mechanism of the second position is quite like that of the first, except that the directions are changed. Rotation takes place by the chin swinging around from the left ilio-sacral synchondrosis to the pubic arch. In making the movement the second rotates into the third position, from which point onwards the mechanism is essentially that of the third.

THIRD AND FOURTH POSITIONS.—The first and second are recognized as unfavorable positions, because the chin is directed backwards, and the necessary rotation is extensive. The third and fourth positions are favorable, because they are mento-anterior positions, and the necessary rotation is but slight. In the latter, the chin, in its descent, strikes against one of the anterior inclined planes, and is directed forwards under the pubic arch; while in the former, even though the chin does usually rotate anteriorly, much delay and difficulty are often experienced. A backward rotation of the chin gives a termination of the most unfavorable description.

A special detailed account of the mechanism of labor in the third and fourth positions is not required, as it differs not at all from that of the second and first positions, respectively, after partial rotation has taken place.

TREATMENT.—The older obstetricians looked upon presentations of the face as not only abnormal, but as always demanding artificial assistance; the treatment being version, when practicable, and instrumental delivery in neglected cases. Later practice is more discriminative.

An important concern of treatment is to preserve intact, throughout the first stage, the bag of waters. This is here a matter of more importance than in vertex presentation, because of the irregularity of the presenting part, and the likelihood of complete escape of the liquor amnii should rupture take place.

Conversion of Face into Vertex Presentations.—This is a matter worthy the closest attention. The manipulations generally recommended are pushing up the face, or drawing down the occiput, by means of the hand passed into the vaginal

and cervical canal. Still, the suggestion has not commonly been acted upon, owing to the difficulties and dangers accompanying it. That it may be done without much effort in favorable cases, the author has, from experience, become convinced.

But it must not be supposed that the demand for interference is laid with equal emphasis on every case. When the face presents in the first or second position, we have an unfavorable condition. In other words, we have an adverse position of an adverse presentation, and by flexing the head we convert the case into a desirable position (occipito-anterior) of a desirable presentation, and the measure of advantage to be derived from the change more than compensates for considerable effort and risk. On the other hand, the third and fourth positions of the face are favorable positions of an unfavorable presentation, and by flexing the head they are converted into an adverse position (occipito-posterior) of a friendly presentation, and we would not be justified in assuming the risk of a protracted or difficult manipulation.

No attempt to change the presentation should be undertaken after the head fairly engages the brim, unless delivery by any other method seems impracticable, as the occipito-mental diameter of the standard fœtal head exceeds every pelvic diameter, and incarceration would be likely to result.

In occasional instances the head can be dislodged by firm pressure, even after a certain degree of descent has taken place, and then it will be managed as in those cases where no descent has been made.

Whenever such manual operations are undertaken, the woman should be put under the relaxing influence of an anesthetic.

The following method of manipulation, suggested by Schatz, is one of the best. It is based on the assumption that, if the body be restored to its normal attitude, by flexing the trunk the head will drop into its normal position at the brim of the pelvis. To operate thus, we should seize the shoulder and breast through the abdominal wall, and lift them upwards, and at the same time backwards, while, with the opposite hand, we steady the breach so as to make the long fœtal axis correspond to the uterine axis. Finally, the breach and thorax are made to approach by downward pressure on the former.

Raising the body, as described, gives the occiput an opportu-

nity to descend, and flexion of the fœtal body, accompanied by backward and upward pressure on the chest, produces flexion of the head. Schatz says that when the head lies high, any attempt to enforce flexion by repression of the thorax, sometimes causes movement of the whole head, for want of resistance, and, in such cases, the place of the pelvic wall may be supplied by pressure of the hand against the head through the abdominal wall. The conditions friendly to the practice of this manœuver are skill in palpation, and the absence of abdominal and uterine irritability. We recently succeeded with this operation in a case where the liquor amnii had been drawn off six



FIGS. 195, 196 AND 197.—Diagrams illustrating Schatz's method of converting Face into Vertex presentations.

hours, and the face had engaged the brim. The child lived, and the mother made an excellent recovery.

MANAGEMENT WHEN THE FACE DOES NOT ENTER THE BRIM.—When the face refuses to pass the superior strait, operative interference is imperatively demanded. It will be understood as unwise practice to await such effort without making a strenuous attempt to convert the case into a vertex presentation; but such efforts may occasionally fail.

Inability of the head, thus extended, to pass the brim, puts the case in this category. The character of the aid to be given will be determined by the circumstances of the case. The head may be flexed by Schatz's method, or by introduction of the hand into the vagina and cervix, and the face thereby converted into a vertex presentation; or podalic version may be

practiced. In either case, internal manipulation should be aided by dexterous external use of the opposite hand. Application of the forceps to the face at the brim, is, in the main, impracticable and hazardous, as the blades cannot well be applied to the sides of the head, and to seize the face over the poles of its long diameter is extremely dangerous to fœtal life, owing to pressure of one blade on the throat, and compression of the large vessels and nerves of the part.

PERSISTENT MENTO-POSTERIOR POSITIONS.—Tardy rotation appears to be characteristic of face presentation, and a fair opportunity to effect the movement should be given the natural forces. The mechanical condition most favorable to forward rotation of the chin is here firm extension, and by maintaining it we greatly augment the probability of proper rotation. The movement may be aided to a certain extent by suitably-directed pressure against the forehead. If these simple methods prove ineffectual, the forceps should be applied, and the head carefully turned in the direction which it should take. If the long curved forceps be used, they will require removal and reapplication for completion of the movement, in order to avoid inversion of the instrumental curve and possible injury of the soft tissues. Every effort to bring forward the chin should be attempted during a pain, but only after the head has evidently cleared the pelvic brim.

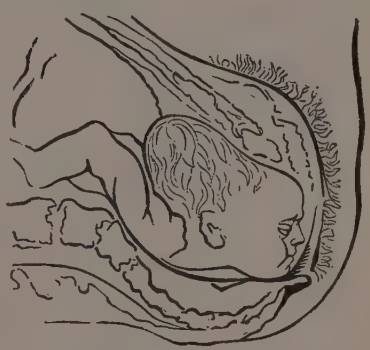


FIG. 198.—Mento-posterior termination of Labor.

Very strong support of the perineum, while favorable to preservation of that part, is dangerous to the child, from pressure of the neck against the pubic arch.

Brow Presentation.—When only partial extension takes place, the brow becomes the presenting part. Such presentations must always be looked upon as of a most unfavorable nature, since the diameter presented is the longest of the cranium. Four positions are given, but, as the presentation is exceedingly rare, and generally becomes transformed into either a face or a vertex presentation, we shall not here describe them. If the head be small, and the pelvis roomy, labor may be

finished without unusual difficulty or injury either to mother or child. The head emerges from the vulva through firm pressure of the cranial vault on the perineum, while the upper jaw, the mouth, and finally the chin, slip under the pubic arch.

TREATMENT OF BROW PRESENTATION.—Treatment consists first in attempts to convert the presentation into one either of the face or the vertex. Baudelocque's method of doing this involves introduction of the whole hand, a thing to be avoided if possible. Schatz's method of operating in face presentation may here serve equally well. The conjoint manipulation, one hand externally, and the fingers of the other hand in the vagina, is sometimes successfully employed. Schatz recommended the introduction of two fingers into the child's mouth, and traction on the superior maxilla, for the production of a face presentation. It has not been our misfortune to encounter a case of brow presentation which could not readily be converted into a vertex presentation.

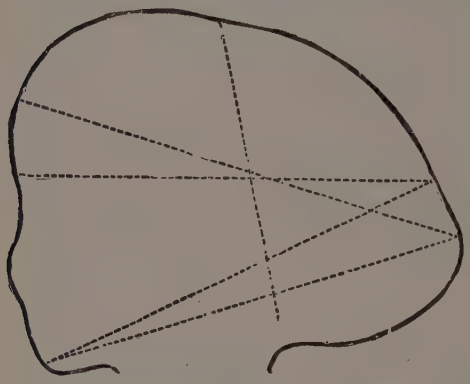


FIG. 199.—Outline of Head,—brow presentation. (Budin.)

CHAPTER VIII.

THE MECHANISM OF LABOR—Continued.

Pelvic Presentations.—Under the general designation "pelvic presentation" are included all those cases where the pelvis precedes the trunk and head of the child in labor. Pelvic presentations are divided into those of the *breech, knees* and *feet;* but the mechanism of labor is in all these substantially one.

FREQUENCY OF OCCURRENCE.—Pelvic presentation is met once in about 47 mature births, while in premature labor and miscarriage it is of common occurrence. Footling presentation is met once in about 100 cases.

PROGNOSIS.—While labor in these presentations is not unusually dangerous to the mother, the perils of the child are greatly augmented. The fœtal mortality in breech presentations is in the proportion of about 1 death in 4 cases, and in footling presentations, 1 death in 3 cases. The following comparative statistics of the Baden maternity are instructive:

In 1883, forceps.	Mortality: mothers,	1.97%;	infants,	12.76%
" " breech extractions.	"	"	2.49%;	"	35.02%
" 1884, forceps.	"	"	1.05%;	"	10.8%
" " breech extractions.	"	"	1.07%;	"	23.05%
" 1885, forceps.	"	"	1.04%;	"	9.08%
" " breech extractions.	"	"	1.02%;	"	25.00%

Pelvic presentations in primiparæ are followed by an extremely heavy fœtal mortality. Robertson says of footling cases, "I do not remember having saved the life of a child, when the feet, in a first labor, formed the presentation." Danger to the mother, in pelvic presentation, is but slightly increased.

CAUSES OF INFANTILE MORTALITY.—The chief element of danger in these cases is interruption of fœtal circulation by compression of the cord. The fœtus may be destroyed by asphyxia, arising also from another cause, namely, premature separation of the placenta, followed by prenatal attempts of the fœtus to respire. Compression of the funis is rarely strong enough seriously to interfere with fœtal circulation, until the pelvis, and most of the trunk, have passed the vulva, and the bony cranium presses the umbilical vessels against the pelvic walls.

Separation of the placenta takes place in these cases, as it

does in all others, as a result of the decided condensation of the uterus, but the action in head-last cases proves premature owing to delay in completing the delivery. Delayed birth of the head is occasioned by insufficient dilatation of the soft parts, the trunk not requiring for its passage as great expansion of the os uteri and vulva as does the head.

Danger to the child is not confined to the moment when the head lies at the brim, but compression of the cord may take place at a later period, and premature separation of the placenta is more likely to be effected after the head descends into



FIG. 200.—Movements of the Breech in first position.

the pelvic cavity, but refuses to pass the vulva. Fœtal circulation is interrupted, and respiration is impossible, as a result of which death from asphyxia soon ensues.

ETIOLOGY OF PELVIC PRESENTATIONS.—It was supposed by the older physicians, that the fœtus sat upright in the womb until the sixth or seventh month, at which time there generally occurred a sudden evolution, as the result of which the cephalic extremity became the presenting part. Failure to effect this movement explained the occurrence of pelvic presentation.

There is no doubt that breech presentation is sometimes the result of a peculiarity in the conformation of the uterus. Velpeau mentions the case of a woman who, probably from

such cause, had six consecutive breech deliveries. Pelvic deformity is also a causative factor. In a case reported by Dr. Randolph Winslow, a colored woman, with a deformity of the pelvic brim, had ten children, every one of whom presented by the breech.

Diagnosis.—Nothing need here be said with reference to diagnosis, as the matter has been fully discussed elsewhere.

THE MECHANISM OF BREECH PRESENTATIONS IN THE FIRST AND SECOND POSITIONS.—The first position of the breech is also known as the left dorso-anterior position, and is one of the

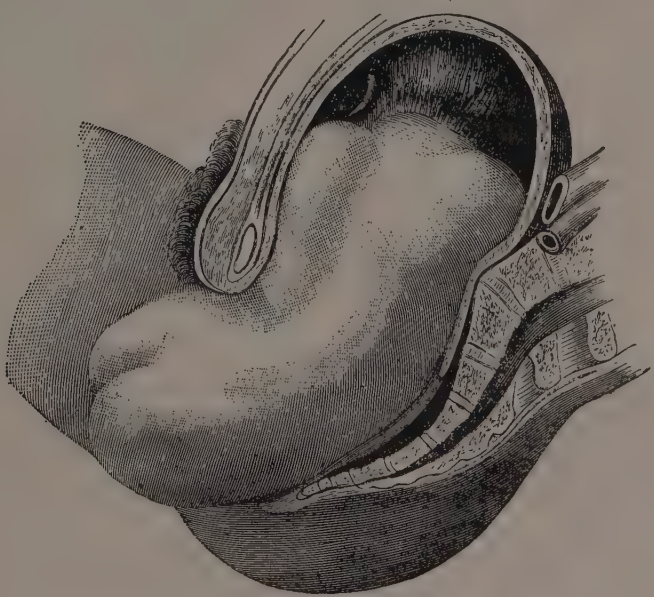


FIG. 201.—Expulsion of the Trunk in breech presentation.

most favorable. The soft and easily moulded breech, preceded or not by the bag of waters, driven into the os uteri, as readily dilates that part as does the head.

Descent.—After the os has expanded sufficiently wide to permit the breech to pass, it gradually sinks, under forcible propulsive action, to the pelvic floor, and approaches the vulva. Descent is usually slow, but dilatation of the os uteri and vagina is not required to be great in order that the trunk may proceed on its way.

Rotation.—There is no extensive rotation in the pelvic cavity associated with breech presentation. In the first posi-

tion, the left trochanter lies forwards and to the right, and, in rotation, it turns from the right side to the pubic arch. In the second position the right trochanter lies forwards and to the left, and, in rotation, it merely comes to the pubic arch. These are both dorso-anterior positions. In the third position, the right trochanter lies forwards and to the right, and in the fourth the left trochanter lies forwards and to the left. Rotation in the former position is from right to left, and in the latter from left to right; but in no case is the traversed distance extensive. Then, too, rotation, insignificant as it is, does not often take place until the nates have pushed through the vulva, and is completed only when the trunk has nearly passed.



FIG. 202.—Delivery of Posterior Arm in Head-last cases. (Zweifel.)

From inattention to the proper management of dorso-posterior positions, the after-coming head may be permitted to descend and enter the pelvis in an occipito-posterior position, in which case cephalic rotation, under unfavorable conditions, becomes necessary.

Expulsion.—The anterior natis makes its appearance at the vulva, and the posterior pushes over the perineum. The anterior trochanter finds a point of support under the pubic arch until the opposite trochanter passes, when both descend, in a forward direction, necessitating considerable flexion of the body in the pelvic canal. As the trunk passes, it is well to have the fingers at the vulva to hook down the arms, which are prone to be thrown upwards. The anterior shoulder rests under the pubic arch until the posterior passes, after which the head alone remains within the vaginal embrace.

The head engages the brim in an oblique diameter, and

usually with the chin upon the sternum. The inclined planes turn the occiput forwards as the head descends. The neck rests in the pubic arch, and serves as a center of motion, and as the body is raised by the accoucheur, the face and sinciput pass the distended perineum, thereby completing the second stage.

THE MECHANISM OF BREECH PRESENTATION IN THE THIRD AND FOURTH POSITIONS.—So far as the trunk and extremities are concerned, there is little difference between the mechanism of dorso-anterior and that of dorso-posterior positions. The chief particular in which they differ has reference to the after-coming head. After expulsion of the trunk of the fœtus, we are apt to find, in neglected cases, that the head engages the brim with the occiput directed to one ilio-sacral synchondrosis or the other, and, in order to secure a desirable termination of the labor, extensive rotation in the pelvic cavity is necessitated, which, by the way, is often attended with much difficulty. This is a complication which can usually be obviated by proper attention to the body in its descent through the outlet. When the trunk and shoulders are of usual size, there is seldom any necessity for close approach of the bisacromial diameter to the pelvic conjugate, at the outlet. Bearing in mind this fact, if we will rotate the trunk on its longitudinal axis during the moment of its expulsion, the head also, which lies perfectly free above the brim, will rotate, in compliance with the suggestion thus offered, and as a consequence, this part enters the brim in an occipito-anterior position. The rotation here advised should be neither rapid nor forcible; though we are often obliged to accelerate the movement to a certain extent, on account of the rapid progress of expulsion.

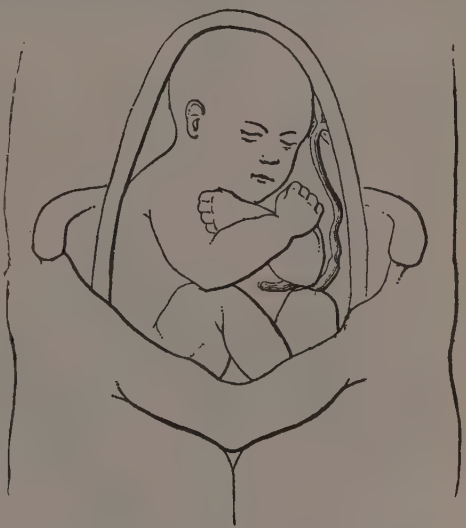


FIG. 203.—Third position of the Breech.

In those cases wherein, from a combination of circumstances beyond the physician's control, the head enters the brim in an

occipito-posterior position, if traction is not applied to the trunk, the condition of head flexion will usually be maintained by the contracting uterus, and rotation will take place in response to slight suggestions from the fingers of the accoucheur. But this movement, and that also of final expulsion, depends to a very great extent on thorough flexion of the head on the breast, and the accoucheur ought to enforce this attitude by proper manipulation. The trunk of the child, wrapped in a towel, should rest upon the most convenient arm, while the fingers of the same hand are passed into the vagina, as far as the child's face. Pressure and traction should then be made with the fingers in the canine fossæ, while at the same time the fingers of the opposite hand exert upward and backward pressure on the occiput, and the body is carried well forwards, as in all cases of pelvic presentation, until the head passes. If the fossæ caninæ cannot at first be reached, the fingers may be passed into the mouth, and moderate flexion force applied to the inferior maxilla until such time as a higher point can be reached.



FIG. 204.—Delivery of the After-coming Head.

In some cases it will be found impossible to bring forward the occiput, and labor must terminate with the occiput to the perineum, and the face to the pubes. There is then the same necessity as at other times for firm flexion of the head, but while enforcing it in the manner already described, the body

should be carried backwards, instead of forwards, until the neck rests on the posterior vulvar commissure, when the face revolves about it as a center, and in so doing glides under the pubic arch.

FOOTLING PRESENTATION.—It is unnecessary to give a detailed account of footling presentation, since the mechanism and management of it agrees in all essential particulars with those of breech presentation. Rotation is delayed until the breech reaches the outlet. The head is delivered with greater difficulty than in breech presentation, since the fœtus, when extended, resembles the form of a wedge, which in footling cases passes the pelvis with its small end in advance.



FIG. 205.—The Forceps applied to the after-coming Head. (Zweifel.)

Treatment of the Arms. — Ordinarily, the physician experiences some trouble in bringing down the arms when they are extended upwards by the side of the head, and occasionally the manœuvre is performed with the greatest difficulty. The fingers of the operator should be passed under the pubic arch, and over the anterior shoulder, when one arm at a time can be made to descend along the anterior surface of the child.

Breathing Space for the Fœtus in Case of Pelvic Presentation. —When the head cannot at once be delivered from the pelvic cavity, and the child is endeavoring to inflate its lungs, the mouth should be drawn well down to the perineum, where air can be admitted to the fœtus by inserting two fingers and making forcible retraction of the perineum and recto-vaginal septum. This is a fertile expedient for saving fœtal life.

Difficult Extraction of the After-coming Head.—The observations which follow have reference to difficult extraction of the head when it lies in the pelvic cavity, and must not be understood as applicable to those cases of difficult head-last cases wherein the obstacle to facial delivery lies in contraction of the pelvic brim.

The ordinary measures which suffice for a goodly percentage of pelvic cases are sometimes found insufficient for speedy extraction of the retained head, and rescue of the fœtus from impending danger demands a resort to some more efficient expedient without unnecessary waste of time. When the occiput is turned towards the pubic arch, an expedient of great efficiency is found in forcible traction at right angles to the woman's body. Properly to secure this necessitates a position high above the patient, such as can be secured by standing upon the bed, when, by getting a firm hold of the child's feet through the intervention of a towel, the necessary traction can be applied. By drawing on the body in this direction the occiput is forced firmly against the pubic arch, and the resistance there encountered produces direct flexion of the head, thereby favoring safe exit from the vulva.

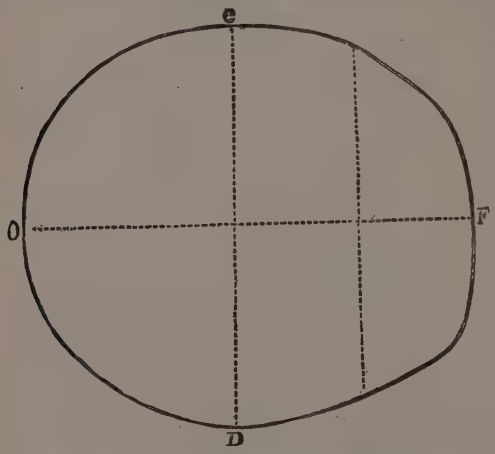


FIG. 206.—Shape of the Head in Breech presentation. *C D*, bi-parietal diameter. *O F*, occipito-frontal diameter.

The amount of traction which may thus be safely applied cannot easily be determined. Dr. Goodell believes that he has put on one hundred pounds and delivered a living child, and in two instances we must have exerted nearly as much traction without injury.

If this sort of treatment avails without the loss of valuable time, it is well; but if it avails not, then resort must be at once had to the forceps. In order properly to apply the instrument, the fœtal trunk should be drawn quickly forwards, and there held while the blades are introduced. It goes without saying

that in these cases the operation should be done with the utmost dispatch compatible with safety.

CONFIGURATION OF THE HEAD IN PELVIC DELIVERY.—The absence of long-continued compression of the head in pelvic presentation, leaves the part in a shape which differs greatly from that observed in vertex and face cases. Instead of the long-drawn-out appearance given it when the vertex is in advance, we have a characteristic roundness, due in part, as is believed, to its circumferential compression by the pelvic canal, while absence of decided resistance above increases the convexity of the cranial vault. Still, the shape of the head usually observed after deliveries in which the breech or feet constituted the presentation, probably approximates the original form of the part.

MANAGEMENT OF PELVIC PRESENTATIONS.—The practice of Hippocrates and his followers, of converting breech into cephalic presentations, was succeeded by that of bringing down the feet. The latter mode of treatment is now regarded as not only undesirable, but, under ordinary circumstances, unwarrantable. We should not make a breech case still less auspicious by converting it into a footling presentation. If the labor is proceeding but slowly, the temptation may be strong to provide ourselves with a part upon which to make traction, and hasten delivery. But the wise man withholds his hand. After expulsion has gone so far that the trunk of the fœtus is partly born, we may feel a strong impulse to seize upon it and hasten the labor. But such interference with the natural phenomena and mechanism of pelvic presentations is liable to involve us in a labyrinth of troubles, not the least vexing of which are extension of the arms above the head, and a separation of the chin from the breast with its lodgment above the pelvic brim. When any traction effort whatever is made, it should be carefully done, and must be supplemented by abdominal pressure.

Cephalic Version Before Labor.—There is a growing conviction among obstetricians, which has been strengthened in our school of practice by late contributions to the literature of the subject from the pens of Drs. R. N. Foster and G. R. Southwick, that the proper management of breech presentation consists, in suitable cases, in conversion of the presentation into one of the vertex before the advent of labor. After relating a typical case, Dr. Foster makes the following points:

"First, that a breech presentation can be converted, *sometimes* certainly, into one immensely preferable, at least two months before full term. The danger of delay is thus avoided, such danger being first that the waters may be discharged before labor has commenced, and then change of position may be impossible; and secondly, that the increased size of the fœtus and the sinking down of the uterus, so that the breech is deeply engaged, may render version impossible even if the waters are retained. In such cases as the one here related, version secures a living child instead of a dead one. This is affirmed on the ground of the second instructive point in the case, which is this: So far as can be discerned, there is but one reason for the very bad results of a breech presentation in the case of this mother; that reason is the peculiar shape of head which prevails in this family, alike in the father and in the mother.

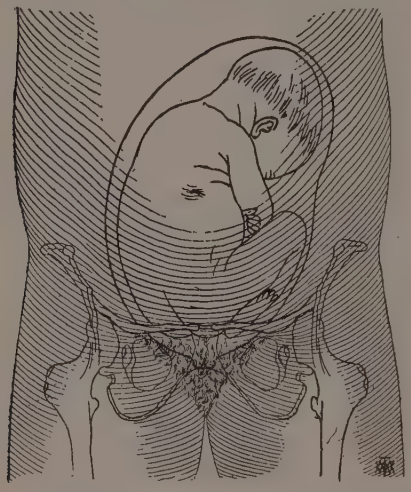


FIG. 207.—Second position of the Breech, which is a little below the brim of the pelvis.

"Obstetricians have long recognized the two varieties of head known as the 'dolicho-kephalic' and 'brachy-kephalic,' or in plain English the 'long-heads' and the 'short-heads.' But this division is incomplete. The family head in this household is neither long nor short, but it is exceedingly broad; and it is this diameter, the bi-parietal, which presenting as it does to the shortest diameters of the pelvis *both at the brim and at the outlet,* constitutes in just such cases the most formidable obstacle to a rapid delivery of the after-coming head. It also endangers most effectively the circulation of the funis, from the moment the head reaches the brim until complete delivery. This style of head ought by analogy to be called the 'platy-kephalic,' or 'broad-head.'

"Now, given a well ossified skull, a male child, and a platy-kephalic cranium, together with a woman who will always present her children by the breech, and we have the precise com-

bination necessary to explain the fœtal mortality in this family.

"And finally, so far as one case can be said to illustrate a principle in such matters, the experience here recorded shows the possible value of attempting version at a much earlier period than that usually advised."

Dr. Southwick presents the subject in a comprehensive and convincing manner, furnishes some good cuts which are herein reproduced, and enters into a detailed description of the operation.



FIG. 208.—Breech raised above the brim of the pelvis. Position of the External and Internal Hands in pressing the breech to one side of the pelvis.

It gives us great pleasure to quote at length from his article. "On account of my own experience," he says, "and from careful observation of the experience of others, I have sought for a remedy for cases likely to be difficult, and believe I have found it in version by abdominal and *vaginal* manipulation about two weeks previous to labor, though I have performed it successfully five weeks before labor. I have found the operation, as I perform it, to be very easy, requiring from five to ten minutes. It is painless, and I manage to talk with the patient, so that she is scarcely aware of what is being done. Indeed, she would not observe more than that she was being examined with some manipulation.

"The preparations are identical with those for external version, a method which I have used with some success if the patient was not corpulent. I have found that the presenting part is apt to catch on the side of the pelvis (Fig. 207), requiring considerable effort to dislodge it, which was not always successful.

"In order to meet this difficulty the writer now operates in the following manner, and will say here that while he is not

aware that any other physician operates in this way, or that there is a published account of it, no doubt there are many obstetricians perfectly familiar with the details.

"I first direct the patient to lie on her back in bed, undressed, in order to relax the abdominal muscles, with the knees drawn close up to the body and the shoulders and head well raised on pillows. I then thoroughly disinfect my hands and introduce the first and second fingers into the vagina, taking care not to enter the cervical canal. My first step is to gently press up the breech through the walls of the cervix, so as to raise the breech up just above the pelvic brim, and, if practicable, towards one side of the brim, corresponding to the back of the child (Fig. 208). Holding the breech in this position with the internal hand, I apply the fingers externally to one side of the breech and easily coax it to one side of the abdomen, corresponding with the back of the child, so that it will be in the position in Fig. 210, hands excepted. The head will move down correspondingly on the other side, and the external hand can now coax it with a little sliding pressure into the brim of the pelvis and by occasionally pushing up the breech (Fig. 209). Should the head stick a little after the breech is pressed well to one side of the pelvis, the left hand must keep its position and hold the breech to one side, as it always tends to slip back, and the right hand is taken from the vagina and applied to the head of the child, as in Fig. 210. By pressing gently up on the breech and down on the head, version is easily and painlessly accomplished. All manipulation is to be avoided during uterine contractions, which are recognized by feeling the uterine muscle harden at intervals. The patient must relax her muscles as much as

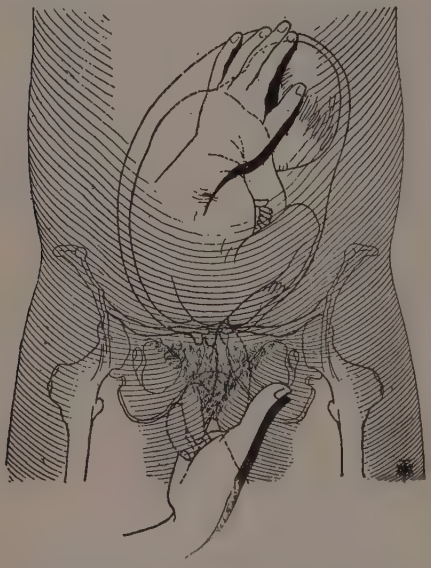


FIG. 209.—Position of the hands in performing Vagino-abdominal Version after the breech has been raised and pressed to one side of the pelvis.

possible, and nothing is better to do this than to make her talk. It is easier to manipulate through thin abdominal walls than if they are very fat.

"There is another way of performing this simple operation, which appears better theoretically; but I have not employed it for this particular form of version, as it is more trying to the patient than the former method, which is so simple.

"The principle is the same, only the patient is placed on that side corresponding to the child's feet. The operator stands behind her, introduces the hand nearest the genitals, presses up the breech through the cervix as before, and the head by force of gravity drops down as the breech goes up, till the child is nearly in a transverse position, when the head is pressed down as before.

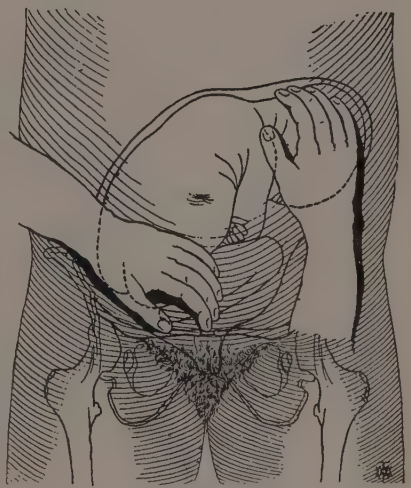


FIG. 210.—Method of performing External Version after displacement of the breech, if that shown in Fig. 209 proves insufficient.

"The question naturally arises, will the infant remain in its new position, and, in view of the child moving about and naturally changing its position in the uterus, when would be the best time to perform version?

"In regard to the first question, I have kept the child in position by a couple of small folded towels on each side of the lower part of the uterus, which are secured by a moderately firm binder. In from twenty-four to forty-eight hours the uterus and child accommodate themselves to each other and the binder is unnecessary.

"The child often changes its position in pregnancy; but in the last month it is rare for any pronounced change to take place, such as the substitution of a vertex for a breech presentation, or *vice versa*. I am of the opinion that about two weeks before the probable date of delivery is the best time to perform version. With the careful manipulation as described above it is difficult to imagine how any harm could follow. It would

be possible for a careless operator to allow his finger to slip into the cervical canal and rupture the membranes. This would cause labor, which ought to be perfectly natural, though possibly more prolonged than if a fortnight later at full term.

"The head brought down to the brim simply substitutes a much more favorable presentation than that of the breech, and as such is subject to the same principles as if it were the primary position. After the first day the patient is up and around just the same as before, and will be confined at the usual term of pregnancy."

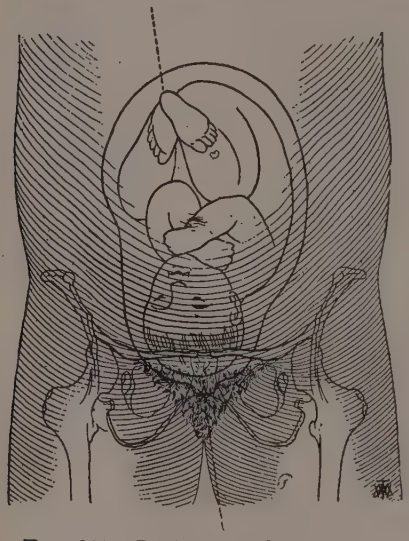


FIG. 211.—Position of Fœtus when version is complete.

These considerations serve to impress upon us the advisability of a careful external and internal examination of every pregnant woman a week or two before the advent of labor.

Cephalic Version During Labor.—When once parturient efforts have set in, cephalic version cannot so easily be performed, and, save under extremely favorable conditions, ought not to be attempted.

Other Operative Measures.—Operative measures, apart from those already mentioned, will be considered under the head of "Operative Midwifery," and nothing need here be said concerning them.

Expulsion of the Trunk.—As expulsion of the trunk takes place it may be received into a dry towel, which has the double advantage of providing warmth for the child, and a better hold for the physician. As soon as the umbilicus is reached, the cord should be drawn gently down, and carefully felt from time to time. If pulsation in it continues good, delivery need not be accelerated, but if it should fail, extraction must be hastened as rapidly as possible.

Extraction of the Head.—The manner of effecting this has been before suggested. The child, wrapped in a towel, should rest on the most convenient arm, and the fingers on the canine

fossæ, enforcing flexion. Unless delivery is easily effected, an assistant may make firm compression on the fundus uteri, while the woman is urged to make her best endeavor. The body must be carried well forward, if the case is occipito-anterior, and well backward if occipito-posterior, with gentle traction. Flexion of the head at the outlet, in occipito-anterior positions, is sometimes better effected through the rectum. Expulsion of the head may also be facilitated by the fingers in the rectum.

CHAPTER IX.

THE MECHANISM OF LABOR—Continued.

Transverse Presentation.—When the fœtal ovoid presents by neither extremity, but lies across the pelvis, we have what is known as "transverse presentation."

A number of varieties may be mentioned, such as ventral and dorsal, as well as shoulder and arm presentations. The fact is, that in the early stage of labor, almost any part of the trunk may constitute the presenting part; but clinical observation has taught, that, no matter what portion of the trunk may lie over the os uteri at the beginning of labor, as the case advances the shoulder or arm is quite sure to descend and constitute the presenting part. Hence in our succeeding remarks on the mechanism of labor in these trying cases, the term "transverse presentation" will be understood as generic, and the principles of management suggested as applicable to every variety of it.

FREQUENCY.—According to Dr. Geo. B. Peck's statistics, transverse presentation occurs once in 115 cases, which agrees with Depaul's observations. According to Dr. Churchill, the arm or shoulder presents once in 231¾ cases, but according to Dr. Peck, once in 180. It is much more frequently observed in multiparæ than in primiparæ.

The Various Positions.—The positions of the fœtus in shoulder presentation have been described in another place, and they do not need to be reviewed here. For the purpose of treatment, it is highly important that we distinguish them, as otherwise we cannot apply our treatment with intelligence and precision.

CAUSES.—The causes of transverse presentation are not altogether clear. Any circumstance which may occur at the brim to divert the head from its usual place, and turn it into one of the iliac fossæ, constitutes an efficient cause; and this may consist of a pelvic deformity; an unusual quantity of liquor amnii, giving to the uterus a form more nearly spherical; obliquity of the long uterine axis; or premature expulsive efforts. The great preponderance of transverse presentations among pluriparæ, would certainly give color to the theory of Wigand, that the phenomenon is dependent on the form of the uterine

cavity, which is probably widened in its transverse diameter and diminished in its longitudinal measurement.

With regard to the time when the presentation becomes established, there is no uniformity. The change is sometimes wrought by a sudden movement, during, or at the beginning of expulsive efforts; while in other instances its existence is known to precede labor by days or weeks.

DIAGNOSIS.—The diagnosis of transverse presentation has been considered, in a general way, in another place; but a few observations may here be added. Abdominal palpation can scarcely fail to reveal the transverse direction of the long axis of the fœtal ovoid. The enlargement is relatively broad, while the fundus uteri is really below the height at which it is usually found in cephalic and pelvic presentations. Deep palpation also reveals the head in one of the iliac fossæ. On vaginal examination the presenting part is found to lie so high that it cannot well be felt through the lower uterine segment; and at the beginning of labor can scarcely be reached through the os uteri.

The stethoscope affords some aid. "If the vaginal examination has resulted in the recognition of a portion of the fœtus which is of small bulk," says Cazeaux, "and if we perceive the pulsation of the heart in the hypogastric region, we may almost certainly conclude that it is the superior extremity. If we heard the heart at the level of the umbilicus, it would in all probability be a leg." If the position is a dorso-posterior one, we will probably be unable to hear these sounds.

Charpentier's remarks under this head are so excellent that we here quote them.

"The finger comes upon a rounded part with a prominent osseous point, the acromion; on following this part we recognize successively the scapula, its spine, and the clavicle. But to recognize these different osseous prominences requires great experience in the touch, and for our part there is a landmark which outweighs all the others, the axillary cavity formed by the arm on one side and the thoracic wall on the other. Moreover, this thoracic wall presents a series of eminences and depressions arranged parallel to each other like the bars of a gate, which Pajot terms the intercostal gridiron. The ribs being thus recognized, we are sure of having the lateral plane of the fœtus before us. Again, the axillary cavity bounded by the arm and the thoracic wall represents an angle, the point of which is necessarily directed towards the head. It is, therefore,

a certain means of indicating the side occupied by the head in cases where it has not been discovered by palpation. The axilla is sometimes difficult to reach in dorso-anterior cases, when the finger must be carried far back, and we can thus always recognize the ribs. In such a case we sometimes encounter the vertebral column of the fœtus, which is marked by the row of projections formed by the spinous processes; on following them, we reach the scapula.

"The head being recognized, and the anterior or posterior location of the back determined by the facility with which the ribs may be reached, the diagnosis is complete; that is to say, we know both the presentation and the position.

"If we find—

The head to the left, back anterior: it is the right shoulder.
" " " " " posterior: " " left "
" " " right " anterior: " " " "
" " " " " posterior: " " right "

"If we know the presenting shoulder and the position of the head, the diagnosis is likewise complete.

"If we find—

Right shoulder, back anterior, the head must be on the left.
" " " posterior, " " " " " right.
Left " " anterior, " " " " " "
" " " posterior, " " " " " left.

"If, on the other hand, we know the shoulder and the situation of the head, the diagnosis is likewise complete.

"If we find—

Right shoulder, head to the left, the back must be anterior.
" " " " right, " " " posterior.
Left " " " left, " " " posterior.
" " " " right, " " " anterior.

"Hence it is sufficient for us to know two terms of the problem to enable us to find the third. If instead of the acromial variety we have to deal with the cubital variety—in other words, if the elbow is the most accessible part—its recognition is sufficient to establish the diagnosis. The elbow is characterized by the projecting olecranon, limited on its right and left sides by two other prominences, the epi-condyle and the epi-trochlea. The bend of the elbow is formed by the forearm and the arm, and it is only necessary to follow either one of these parts to convince us that it is the elbow we are touching. The forearm will lead to the hand, recognizable by being

in the axis of the arm, by the length of the fingers, the apposition of the thumb, and the inequality of the fingers. In order to distinguish which hand we are touching, it is best to determine the characteristics and the situation, and to substitute mentally our own for it. The one we can, as it were, superimpose upon the one felt will indicate whether it is the right or the left hand. This gives us the shoulder, or the elbow indicates the situation of the axilla; in either case the diagnosis is complete. Pajot advises, in doubtful cases, to make traction on the hand felt externally and compare it with one's own; this will show whether it is right or left.

"If the hand is outside the vulva, it is sufficient to compare it with either one of ours to show whether it is the right or the

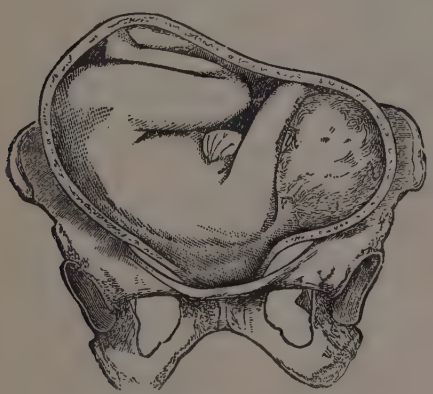


FIG. 212.—Dorso-anterior position of the Fœtus in Transverse presentation.



FIG. 213.—Dorso-posterior position of the Fœtus in Transverse presentation.

left; but there is a more scientific and equally reliable procedure. Take the protruding hand and turn it palm upwards, the border inferior to the symphysis pubis; the thumb will always be turned to the thigh homonymous to the hand, to the right thigh in the case of the right hand, and *vice versa*. When the shoulder is known, we need but follow the arm to reach the axilla, and thus the situation of the head and the diagnosis is complete.

"When the hand depends freely from the vulva, the arm in its natural attitude, simple inspection of the hand will complete the diagnosis.

"The hand gives us the shoulder; besides, the back of the hand always turns away from the side where the head is. This

gives us two terms of the problem, and we can find the third without difficulty and complete the diagnosis. But examination of the hand suffices.

"The hand gives us the shoulder; the dorsum of the hand, the situation of the head; the direction of the thumb indicates the direction of the back; for when the back is posterior, the thumb points upwards from the symphysis. When the back is anterior, the thumb is directed downwards towards the anus."

PROGNOSIS.—In any case, the danger to both mother and child is considerably augmented, yet the prognosis will be greatly modified by the stage of labor at which the case comes under observation. From carefully collected statistics, tabulated by Churchill, it appears that "out of 314 cases of presentation of the superior extremities, 175 children were lost, or rather more than one-half. Out of 282 cases, 30 mothers were lost, or nearly 1 in 9." Statistics of more recent practice would show a great reduction in the rate of mortality.

Unaided Termination.—Dr. Rigby gave a graphic picture of a case of transverse presentation when left to its natural termination. "After the membranes have burst," says he, "and discharged more liquor amnii than in general when the head or nates present, the uterus contracts tighter around the child, and the shoulder is gradually pressed deeper into the pelvis, while the pains increase considerably in violence from the child being unable, from its faulty position, to yield to the expulsive efforts of nature. Drained of its liquor amnii, the uterus remains in its state of contraction even during the intervals of the pains; the consequence of this general and continued pressure is, that the child is destroyed from the circulation in the placenta being interrupted, the mother becomes exhausted, and inflammation and rupture of the uterus and vagina are the almost unavoidable results."

In these days of enlightened midwifery practice such cases are rarely committed to the natural efforts, thus hopelessly handicapped; hence, what we know of them is learned chiefly from old reports.

Spontaneous Evolution and Spontaneous Expulsion.—Transverse presentations differ from the other presentations in having no regular and uniform mechanism of labor; but there are two movements occasionally observed, by the adoption of which nature has succeeded in concluding the process of parturi-

tion; these are *spontaneous version* or *evolution*, and what was designated by Douglas as *spontaneous expulsion*.

Both have always been extremely rare.

Spontaneous evolution or version consists in a complete version of the fœtus begun by the escape of the shoulders from the grasp of the pelvic brim, followed by descent of the trunk and pelvis of the child. This process is not nearly so frequently observed as that of spontaneous expulsion, first described by Dr. Douglas, of Dublin. In this the shoulder does not recede from the brim and give place to the other parts, but it descends until it lodges under the pubic arch, where it constitutes a pivotal point about which the body of the child rotates. This constitutes version within the pelvic cavity. "It will be obvious," says Leishman, "that such a mechanism as this can only be possible under the same exceptional conditions which permit of spontaneous evolution. For in this case the breech must pass the pelvic brim, which is already partly occupied with the base of the skull, an occurrence which is manifestly impossible, if the relative proportion of the parts, maternal and fœtal, are in accordance with the normal standard."

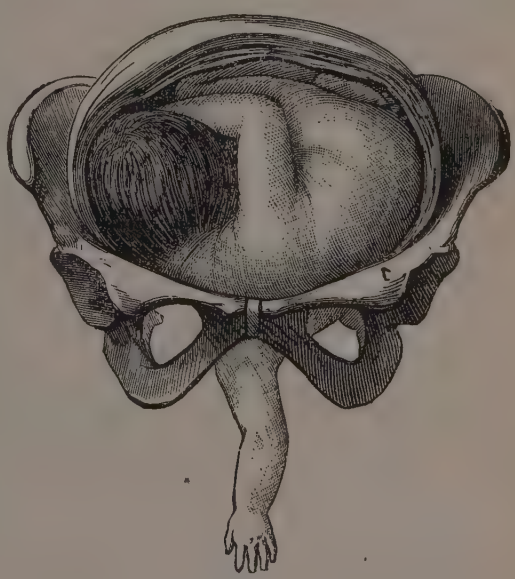


FIG. 214.—Showing a case of Transverse presentation wherein the liquor amnii has escaped, the arm has descended, and the shoulder is wedged into the brim.

The various stages of this important movement are made more lucid and impressive by the accompanying cuts than could be done by any number of words.

TREATMENT.—No one point is of such importance as a recognition of the character of the case at the earliest possible moment. This involves, too, not a mere diagnosis of transverse presentation, but a recognition as well, of the position

occupied by the fœtus, for upon this the success of treatment will largely depend. When such knowledge is obtained at the beginning of labor, or soon thereafter, we may look upon the case with composure, knowing that the issue lies in great measure under our control. Both mother and child are still possessed of unimpaired vitality, and the aim of our treatment will be to interfere before vitality has been seriously reduced. In fact we ought to have such close supervision of pregnant women who propose to give us the management of their labors, that the nature of the presentation shall in every instance be recognized before the day of delivery.

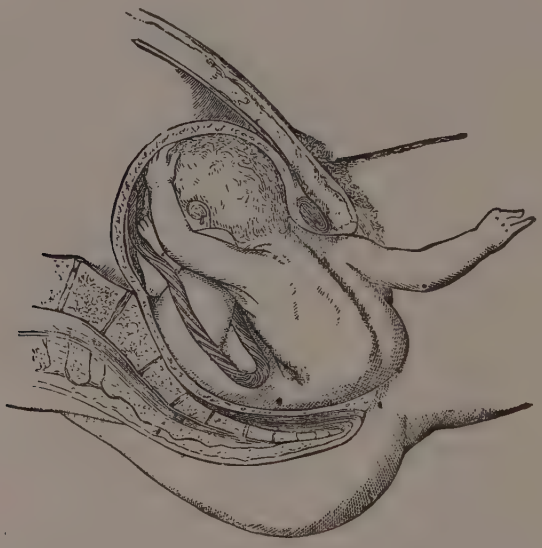


FIG. 215.—Spontaneous Expulsion. (First stage.)

The Favorable Moment for Operating.—The most opportune time is before the advent of labor, when, by external manipulation, cephalic version can usually be performed after labor begins; there likewise comes to all these cases a favorable moment, and happy the accoucheur who discerns it with precision and is prepared to apply the suitable treatment with a vigorous hand, a wise judgment, and a courageous heart.

Preservation of the Membranes.—It is of the utmost importance that the membranes be preserved intact up to the moment of interference. This consideration will lead to delicate, but none the less painstaking, digital exploration, which should be pressed only in the intervals between uterine contractions.

Version.—Some form of version is required in such presentations, save in rare and neglected cases, wherein the expulsive process has gone so far as to destroy all reasonable prospect of success.

The various methods of practicing version will be discussed in another chapter, and we are called upon in this place only to indicate the relative value of the different modes of performing it. Cephalic version, or a bringing down of the head, is suitable to most of those cases in which there is early recognition of the unfavorable nature of the presentation, and, under favora-

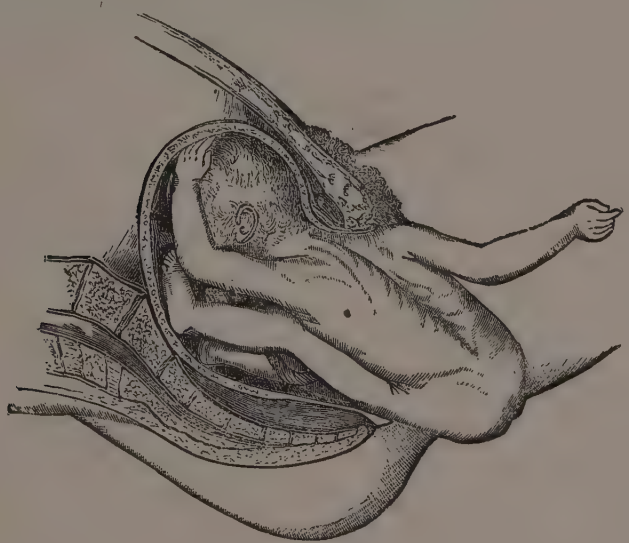


FIG. 216.—Spontaneous Expulsion. (Second stage.)

ble conditions, will scarcely fail of success. This is best practiced by Dr. Braxton Hicks' method of conjoint manipulation.

A mode of delivery in transverse presentation has been practiced with success by some, which is merely a modification of the Hicks method, consisting of the knee-elbow position, cephalic version by conjoint manipulation, and application of the forceps. Cephalic version is greatly facilitated, in some respects, by the knee-elbow position, since the force of gravity diminishes the pressure at the brim and places the child in a more mobile situation. When once cephalic version has been effected, the forceps are applied with the woman still on her knees and elbows, though the awkward posture does not permit it to be done with the usual facility. She is then permitted to

turn upon the back, and delivery is wholly or partially effected. What was a formidable case is, from the time of forceps application forwards, an ordinary instrumental delivery from above the pelvic brim, through a partly dilated os uteri.

The form of version most commonly practiced is the internal podalic, which consists in introducing the hand within the uterus and bringing down the feet, the conditions favorable to which are an intact state of the membranes, and dilatability, or dilatation of the os uteri.

When either of the first two modes of version is to be employed, only moderate dilatation of the os is requisite; but, when the last mode is to be adopted, labor should be attentively watched during the first stage, and if the membranes are preserved, and no serious symptoms are developed, we may safely await with patience the moment when dilatation will be nearly complete. Should the waters sooner escape, or should the presentation be descending too rapidly into the embrace of the pelvis, then, provided the os uteri is as large as a half-dollar, and in a dilatable state, the operation should be undertaken without unnecessary delay.

The feet can sometimes be brought to the os uteri by the method of conjoint manipulation mentioned in connection with cephalic version. It is clearly the preferable mode if the case be a suitable one for its practice, inasmuch as an operation, in the performance of which only one or more fingers, instead of the whole hand, are introduced within the uterus, must involve less risk than that attending the older method of drawing down the feet. Hence, unless the conditions surrounding the case offer positive discouragement to the conjoint method, it is advisable at first to make an attempt at version in that manner, and if it fail, then to have recourse to the more common method of internal version.

In any case wherein we have decided upon use of conjoint manipulation for the purpose of rectifying a transverse presentation, it ought to be undertaken as soon as the os uteri will admit two fingers, as delay beyond that time progressively diminishes the probability of success.

But there is a class of cases quite different from these with regard to which apprehension will arise, and in the treatment of which great difficulty will be experienced. "Though always more or less dangerous," says Blundell, in his earnest, eloquent way, "the operation of turning may often be accomplished

easily enough, provided it be performed early enough, and circumstances conduce. Hence you will sometimes hear your obstetric acquaintances triumphantly exclaiming—'For my part, I always turn without any difficulty;' a declaration, by the way, which evinces not their superior skill, but their small experience in the nicer and more dangerous parts of practice. In consultation, especially, we sometimes meet with cases of turning—embarrassed at once with difficulties and dangers: the body of the uterus is constricted about the fœtus; the mouth and cervix are more or less firmly contracted around the presenting part; the passages are swelled, inflamed, and dreadfully irritable; the patient, wearied with exertion, and desperate through suffering, cannot be persuaded to lie at rest upon the bed; and thus, sometimes, though rarely, a case is treated which might try the nerves and the muscles of even those minions of obstetric fortune, to whose superlative skill all difficulties give way."

If the arm and hand have prolapsed, no attempt should be made to replace them before proceeding to operate. The woman should be carefully brought under the influence of an anesthetic, not only to prevent suffering, but to allay uterine irritability, which would interfere with a speedy and relatively easy accomplishment of our purposes. The details of the operation will be given in another place. The necessity for the utmost gentleness and caution should be kept constantly in mind, for "wombs and women are not to be taken by assault."

A thrust of the hand here is as fatal as a thrust of the bayonet.

When the Fœtus is Dead.—If the physician, on being called to a case of shoulder presentation, find clear evidence of fœtal death, he will be led to adopt a different method of treatment, and one less hazardous to the woman. The signs in question are a flaccid, pulseless cord, if it can be felt, and exfoliation of the skin as the result of incipient maceration. For such cases evisceration is the treatment.

Unaided Termination.—In rare cases it may be obvious that labor is about to terminate without manual aid, by means of one of the movements previously described. During a pain, the child is observed to move in such a way as clearly to reveal its design to effect either spontaneous evolution or expulsion. Under such circumstances, the expectant plan of treatment is the proper one. "If the arm of the fœtus," says Douglas, "should be almost entirely protruded, with the shoulder press-

ing on the perineum; if a considerable portion of its thorax be in the hollow of the sacrum, with the axilla low in the pelvis; if, with this disposition, the uterine efforts be still powerful, and if the thorax be forced sensibly lower during the pressure of each successive pain, the evolution may, with great confidence, be expected."

Other Operative Procedures.—When all other means have failed to effect delivery, and, again, when the fœtus is certainly dead, it may be decapitated, it may be eviscerated, or it may be delivered through abdominal incision.

Complex Presentations.—The most common forms of presentation, and even some of the uncommon varieties, have been mentioned; but there are others of rare, though possible occurrence, wherein the presentation is compound in character, as, for example, when the hands and feet descend together. Most complex presentations are modifications of transverse positions, while in some, the long fœtal and long uterine axes maintain their parallelism. A description of one or two of them will be briefly given.



FIG. 217.—The use of the Fillet with a Running Noose.

Hand with the Head.—This is not an uncommon occurrence, especially when the fœtus is small in comparison with the pelvic canal. Labor does not become seriously impeded provided extensive descent of the hand be prevented. But even when the arm becomes thrown down beside the head, the situation does not constitute an effectual bar to labor, which, indeed, may still be terminated in a satisfactory manner. When from lack of room the complication becomes serious, suitable treatment consists in pushing up the arm by means of the half-hand in the vagina. In affording such relief it behooves us to be careful to avoid displacing the arm backwards, and thereby producing a still more awkward condition of things.

The Feet and Hands.—Both feet and both hands may present, or but one of each, and thereby form a variety of transverse presentation. Such a complication is sometimes still further increased by prolapse of the umbilical cord. Left to the natural efforts, the foot, or feet, after a time, are likely to recede, and a shoulder may descend; or the presentation may not

change, but be driven downwards, and finally become wedged into the brim. To prevent such an occurrence, the foot, or feet, should be seized, and drawn down, while the hand is pushed upwards, thereby completing the operation of version at the expense of but slight effort. If this is undertaken early in labor, no great difficulty will be experienced; but when attempted at a late period it may utterly fail, or at best be accomplished as the reward of strenuous and dangerous effort. In difficult cases a fillet ought to be attached above the ankle by a running noose, and steady traction made upon it, while at the same time the hand is pushed upwards, and the version further aided by abdominal manipulation. When such a presentation is rendered still more complicated by descent of the funis, an attempt should be made to send the cord back into the uterine cavity with the presenting, but now receding, hand and arm, failing in which, the case should be treated as one of prolapsed funis with footling presentation.

Both reposition of the cord, and completion of version, will be favored by putting the woman into the knee-elbow position.

Head, Hand and Foot.—The head, hand and foot have been found presenting together, and to these has even been added prolapse of the cord.

Version is here again a necessity, and should be undertaken at the earliest practicable moment.

Other forms of complex presentation might be mentioned, but to do so would be useless, since their treatment is in accordance with the principles already laid down.

Prognosis of Complex Presentations.—Any form of presentation which involves the performance of so serious an operation as podalic version, is always attended with increased risk both to mother and child. The degree of fatality obviously depends in great measure upon the stage of advancement in parturition at which interference is practiced, and the consequent difficulties which are encountered.

CHAPTER X.

PARTURIENT ANOMALIES REFERABLE TO THE EXPELLENT FORCES.

Labor is said to be physiological in those cases wherein the natural forces are able to overcome the resistance usually offered by the soft parts, or the bony pelvis, without seriously injuring any maternal structure, consuming too much time, or considerably increasing the risk. It becomes pathological from entrance of a variety of disturbing elements referable to the expellent forces, the maternal soft structures, the maternal bony structures, the fœtus itself, and also various anomalous conditions.

Patients judge labor pains by their subjective effects, and they therefore describe "cutting pains," "grinding pains," "forcing pains," and so on. The accoucheur judges of them by their objective effects, and therefore describes "efficient pains," "propulsive pains," "unavailing pains," and so on.

As the result of anomalous action of the expellent forces we accordingly have (1) precipitate labor and (2) protracted labor.

In no two instances do we observe the same phenomena. Sudden and decisive changes occur at various stages of what may rightly be regarded as normal cases. That is to say, up to a certain point labor may progress with the utmost regularity and uniformity, the pains coming and going with clock-like precision, and dilatation proceeding without hesitancy. Descent may begin, and proceed well for a time, and then there comes a halt which causes the patient to lose heart. Again, a case may proceed in a leisurely manner up to a similar period in the process, when suddenly the expellent forces take on new energy and bring the labor to an abrupt termination.

Precipitate Labor.—There are several degrees of precipitate labor. In its milder forms it is commonly attended with but slight inconvenience, and as little danger. Such are the majority of easy labors. But there are cases in which the contractions are so powerful, vehement, frequent and uncontrollable, as to result in serious traumatism of the cervix uteri, perineum, and even the body of the womb itself. The fœtus traverses the parturient canal with such rapidity as to fall on the street, on the floor, into the chamber-vessel, or into the closet-bowl. In

cases like these the woman suffers few pains, but they are so redoubled in severity as sometimes to produce convulsions, apoplexy, and mania. When labor terminates with the woman in the erect posture the child's fall is usually broken by the cord, severance of which is rarely followed by hemorrhage. The involuntary efforts of the woman may be so strong, especially when the vulvar structures are still unrelaxed, and the pelvic floor offers strong resistance, as to cause subcutaneous emphysema of the head and neck, to modify the utero-placental circulation, and even to fracture the fœtal skull, as well as to result in laceration of the tissues in and about the vulva.

The following remedies may be given, but we do not always have time to get their action before labor is brought to a close.

Excessively severe labor pains: *coffea, nux vomica, caulophyllum.*

Labor-pains too prolonged and powerful: *secale.*

Chloroform serves to apply the brake more effectually and rapidly than anything else, and, if needful, it should be carried to the extent of deep anesthesia.

Uterine Inertia.—*Weak Labor.*—In some women there is a lack of tone in nerve and muscular fiber which exercises a marked influence on the character of labor. "In women, moreover, of this temperament," says Leishman, "the anatomical peculiarities of the sex are generally well marked, and the ample and shallow pelvis thus offers a comparatively trifling resistance to the passage of the child. If, however, we contrast with this the tall, vigorous and muscular women, we find that in the latter there is a very general tendency to the male type of pelvis, involving a tardy passage of the child through the pelvic canal. May we not infer that it is in some degree in compensation for this that she is furnished with muscles so powerful, and constitutional vigor so marked, to enable her to overcome the greater resistance which in a feebler frame would constitute an insurmountable barrier."

We might with propriety include under the head of tedious, or prolonged labor, all cases wherein expulsion of the fœtus is unusually delayed, from whatever cause delay may arise; but in this place we shall speak only of labor protracted from causes referable to deficient action of the expellent forces.

The average duration of labor is from eight to ten hours, the latter for primiparæ, and the former for multiparæ. Labor may be weak from the very beginning, or, as we have said,

inertia may develop in a case which, up to near the close of the second stage, has been vigorous and active.

CAUSES.—Uterine inertia finds in general debility,—the result, it may be, of disease,—and in constitutional feebleness, a predisposing cause. The immediate cause is most frequently attributable to over-exertion during a protracted first and early second stage, uterine inertia being an expression of the complete exhaustion from which the woman suffers. Rapid child-bearing doubtless has a marked effect in the same direction. Excessive and premature uterine retraction is an efficient cause in quite a percentage of cases; and also adhesions of the membranes to the lower uterine segment. High temperature of the surrounding atmosphere, such as we get in the middle of a hot summer, because of its depressing effects may be reckoned as a cause. Sudden and profound emotion, in women of a highly nervous organization, is capable of weakening the pains, and even of temporarily suppressing them; but the action of such a cause is not often sustained for a lengthened period. Overdistension of the bladder or rectum, and a condition of inflammation in the abdominal viscera, may be reckoned among the causes of this condition. Hydramnios should also be mentioned, its effects, however, being limited to the first stage. The age of the patient has a marked influence. In young girls there appears to be a proneness to weak and irregular uterine action, and in those nearing the close of the child-bearing period, powerless labor is by no means an infrequent occurrence.

SYMPTOMS.—In the first stage, weak labor is indicated by pains which come and go with little less than usual regularity, but which, while they may produce marked sensory impressions, further but slightly the parturient process. They are short, teasing and discouraging in character. When given an abundance of time they succeed at last in opening up the os uteri, and launching the woman, weary, worn and disheartened, into a powerless second stage.

Then the case drags. There is little propulsive energy in the contractions, and the woman cannot bring herself to the exercise of much voluntary effort. There may not be absolute arrest of the parturient process, but it proceeds so slowly that progress has to be measured by hours. Left to itself, the case may ultimately culminate in spontaneous delivery, but occasionally it is overtaken by profound inertia, and requires artificial aid.

After the child is born the same leisurely movement continues, and but for assistance the placenta would likely tarry in utero for an indefinite period. When once entirely empty, the uterus contracts in a listless, hesitating way, and, should there be in the patient a predisposition to hemorrhage, a serious example of it is liable to develop, unless averted by wise prophylactic measures.

TREATMENT.—The following suggestion with regard to preventive treatment of these cases should be remembered: "The moment we find the least evidence of flagging power," says Dr. Edis, "of any cessation of pains, any intermittence in the regular beat, or any acceleration of the patient's pulse, or any general evidence of the patient having had more than she can fairly compass, I think we are bound in duty to assist the patient, and not allow her to go on until she is in powerless labor."

The character of curative treatment will be determined by the causes contributing to inertia, and the stage of labor in which it is manifested. The condition of the bladder and rectum should be investigated, the mental state and age of the woman considered, and the character of the presentation, and state of the uterus, as regards retraction, passed under review. When it evidently depends on excess of liquor amnii, the membranes, in the absence of contra-indications, may be ruptured, and a part of the fluid permitted to escape. Adhesions of the membranes to the lower uterine segment can be broken up by sweeping the finger about within the os uteri. A warm vaginal injection will sometimes promote uterine contractions and favor physiological reduction of the cervix. Barnes' bags are of service for opening the os, but far better and more effective, we believe, is manual dilatation practiced with the utmost caution.

In protracted second stage, resulting from inefficient uterine action, much aid can be afforded by properly directed manual pressure on the fundus uteri. It is better borne in labor which is prolonged through weakness of the expellent forces than in labor which is protracted by reason of resistance in front of the presenting part. In the latter case the energetic uterus resents interference, but in the former it invites it.

Aid of this kind should be given by the palms of the hands, and pressure made in the direction of the long uterine axis. It

need not be added that there is no intention to supplant the natural efforts, but to reinforce them.

When the head, in cases of uterine atony, lies at the outlet, it can usually be expelled by means of two fingers in the rectum, combined with abdominal pressure.

Ergot has been commonly employed by the old school for the purpose of arousing the sleepy uterus, but even among its own practitioners the drug is falling into disrepute. In our early practice we also cherished a liking for it, but are now convinced that the outcome is likely to be more gratifying when strict homeopathic indications are followed.

The appended therapeutic hints are not intended to be specific guides in practice, but mere finger-boards pointing to the possibly indicated remedies. In order to obtain satisfactory results from our remedies they must be chosen with due regard to temperament, constitutional traits, known systemic taints, and the peculiar individual symptoms of each case.

THERAPEUTICS.—*Inefficient.*—Labor-pains violent and frequent, but inefficient; patient says she cannot breathe; is restless, anxious and impatient; *aconite.*

Labor-pains too weak, but regular; *æthusia.*

Labor-pains violent, but inefficient; feels lame and bruised; *arnica.*

Labor-pains tormenting, but useless, in the beginning of labor; *caulophyllum.* This is an excellent and frequently indicated remedy, especially in rheumatic patients.

Labor-pains short, irregular, spasmodic; patient very weak; no progress made: *caulophyllum.*

Labor-pains spasmodic and irregular, especially in women who have had great grief or anger: *cocculus.*

Labor-pains spasmodic: *causticum, ferrum, pulsatilla, nux vomica.*

Labor-pains spasmodic, cutting across from left to right, nausea, clutching about the navel: *ipecac.*

Labor-pains spasmodic, painful but ineffectual: *platina.*

Labor-pains spasmodic; they exhaust her greatly: *stannum.*

Labor-pains spasmodic and distressing; patient irritable: *chamomilla.*

Labor-pains weak and inefficient; patient weak; has slow, feeble pulse: *caust., kali carb.*

Labor-pains distressing, but of little use; cutting pains across abdomen: *phosphorus.*

Labor-pains ineffectual, of a tearing, distressing character, seemingly not properly located: *actæa.*

Labor-pains prolonged, but ineffectual: *secale.*

Labor-pains severe, but not efficacious; she weeps and laments: *coffea.*

Weak, false, deficient. Labor-pains weak or ceasing; she wants to change position often; feels bruised: *arnica.*

Labor-pains weak or ceasing; she will not be covered; restless; skin cold: *camphora.*

Labor-pains deficient or absent; she has only slight periodical pressure on the sacrum; amniotic fluid gone; os uteri spasmodically closed: *belladonna.*

Labor-pains weak or ceasing, with great debility, especially after violent disease or loss of animal fluids: *carbo veg.*

Labor-pains become weak, flagging, from protracted labor, causing exhaustion; patient thirsty, feverish: *caulophyllum.*

Labor-pains cease from loss of blood: *china.*

Labor-pains ceasing, with complaining loquacity: *coffea.*

Labor-pains gone, os widely dilated, complete atony: *gelsemium.*

Labor-pains feeble and inefficient; patient anæmic, weak; slow, feeble pulse: *causticum, kali carb.*

Labor-pains weak, accompanied with anguish and sweat; desires to be rubbed: *natrum mur.*

Labor-pains spasmodic, irregular; drowsiness: *natrum mur.*

Labor-pains deficient, irregular, sluggish; patient has light complexion, blue eyes, tearful mood: *pulsatilla.*

Labor-pains deficient, irregular, sluggish; patient has dark hair and eyes: *nux vomica.*

Labor-pains deficient, with os soft, pliable, dilatable: *ustilago.*

Labor-pains suppressed, or too weak: *secale.*

Labor-pains cease; coma, retention of stool and urine, from fright: *opium.*

Labor-pains cease, or become weak, from anger: *chamomilla, colocynth, cocculus.*

Labor-pains cease from excessive grief: *ignatia, cocculus.*

THE FORCEPS IN INERT LABOR.—There is occasion for the utmost discretion in the use of the forceps in cases of weak labor proceeding from real uterine atony. We should here distinguish between the latter condition and that of premature or excessive uterine retraction. In the latter instance, the in-

struments are not only called for, but there is little, if any, danger attending their use. The same cannot be said of the former condition. The head in a given case descends into the pelvic cavity under the influence of fair pains; but after a time the pains become so feeble that progress is arrested. Long delay under such circumstances is not free from serious danger to the woman, owing to continuous compression of the soft pelvic tissues. Recourse is had, perhaps, to various well-indicated remedies, without relief. The uterine energies are either too broken promptly to respond, or, after a time, the forceps are applied and delivery finished without difficulty; but we find that the uterus, instead of assuming its usual cannon-ball contraction, remains weak and sluggish, with the effect to develop an aggravated attack of post-partum hemorrhage. The danger, then, in all such cases is, that the atony with which the uterus is stricken will continue, and excessive bleeding result. On the other hand there is little danger of such an occurrence in connection with labor rendered weak by the premature or excessive retraction of the uterus alluded to above.

Now, if before using the forceps, even moderate re-awakening of the organs be secured by remedies and the application of suitable stimulus, we may proceed slowly with our forceps delivery without incurring much danger of subsequent hemorrhage. Unless a complete atony exists, the very introduction of the instrument communicates a certain degree of stimulation of the most effective kind, so that our traction efforts are often found to be reinforced by vigorous uterine action. The point which we wish to establish is that, bearing in mind the dangers which are most liable to arise, we should fortify ourselves against them by adopting such precautions as are described in connection with the prophylactic treatment of post-partum hemorrhage.

TREATMENT OF THE THIRD STAGE OF LABOR COMPLICATED BY UTERINE INERTIA.—The great danger associated with uterine weakness in the third stage of labor is that of post-partum hemorrhage. A sluggish uterus in this stage is always the cause of much anxiety. Hemorrhage may set in early, immediately succeeding placental delivery, or it may not appear at all. There should be no haste to deliver the placenta, and no traction on the cord. With the hand firmly grasping the organ through the abdominal walls, we should for a time maintain an expectant attitude, unless bleeding set in. We must

watch and wait. The recurrence of firm uterine contraction will be taken as a signal for delivery of the placental mass by pressure on the fundus, combined with moderate traction on the cord

Following such a delivery the uterus ought to be firmly held for twenty or thirty minutes.

With a weak third stage of labor irregular uterine contraction is often associated, the fibers of a certain part acting more energetically than others and forming a constriction, most frequently at one angle of the uterus, but often at or near the site of the internal os, by means of which the placenta is retained. The stricture does not often long persist, but it may be soon overcome by action of the suitable remedy. *Belladonna, gelsemium, cuprum* and *caulophyllum* are indicated in a general way, and our choice between them will be based on the special symptoms observed.

Belladonna.—With this remedy the patient is disposed to be quiet; is usually plethoric, and in good flesh; withal, during the labor she may have complained of occipital headache.

Gelsemium.—The woman desires to be left alone; is nervous and excited; may be more or less hysterical.

Cuprum.—Is especially suited to women who have a good deal of cramping of various muscles during pregnancy, and in whom the pains of labor take on a somewhat crampy nature, especially in the early stage.

Caulophyllum.—Patient weak and nervous, and the uterus sensitive to pressure.

Many other remedies may be found serviceable, among which are—

Chamomilla.—The woman is irritable, thirsty and restless; desires fresh air; declares she cannot endure her distresses.

Cocculus.—This remedy is especially suited to women who have recently been greatly stirred by grief or anger.

Amyl nitrite by inhalation is very effective in some cases. Only a few drops should be inhaled, and even then with caution.

Under no circumstances should a patient be left alone until the placenta has been delivered, for the muscular fibers of the body of the uterus may relax and give free vent to hemorrhage.

Forcible reduction of an irregular contraction of the uterus should not be undertaken at once, unless alarming hemorrhage sets in. Patient waiting and careful prescribing usually bring about the desired result. Should there be failure, a gentle but

firm endeavor to overcome the spasmodic condition ought after a time to be made, in order to release the placenta. The method of doing so is thus given by Lusk: "The plan I have followed of late years, with uniform success, consists in introducing the index and middle fingers, with the whole hand in the vagina, to the point of constriction. Then, by pressing the uterus downwards, the fingers are brought in contact with the placental border. Now, it is only necessary to draw a single cotyledon into the canal to render the further extraction a matter of certainty. Under the pressure of the soft placental mass the stricture relaxes slowly. By combining expression with slight traction, the delivery is surely accomplished. The principal difficulty of the operation lies in the manipulations needful to bring the placenta at the outset to the point of stricture, but this difficulty can be pretty certainly overcome by patience and the determination to succeed. During the period of withdrawal the operator should be content with a very slow progression, proportioned to the yielding of the tissues; otherwise the presenting portion of the placenta tears away, when the labor expended is lost."

CHAPTER XI.

PARTURIENT ANOMALIES REFERABLE TO THE MATERNAL SOFT PARTS.

Much difficulty is experienced by the fœtus in its escape from the uterus and passage through the pelvic canal, proceeding from faulty conditions of the maternal soft parts. Among these we may name, rigidity of the os uteri, atresia of the cervical canal, tetanoid constriction involving the lower uterine segment, tumefaction and incarceration of the anterior lip of the os, carcinoma of the cervix, thrombus of the vagina and vulva, cystocele, scybala in the rectum, calculi in the bladder, uterine polypi, ovarian growths and rigid perineum.

RIGIDITY OF THE CERVIX UTERI.—Rigidity of the cervix arises from different causes, and is dependent on various pathological conditions.

1. It may come from incompletion of the physiological process of softening, which takes place during pregnancy, and is usually more or less pronounced in every case of premature labor.

2 Abnormal rigidity of the os externum is often encountered in multiparæ as the result of genuine cicatricial processes.

3. Fibrous hypertrophy of the cervical body is occasionally met. This condition is especially observed in connection with prolapse of the uterus.

4. Carcinoma of the cervix, as mentioned in another place, gives rise to most persistent rigidity.

5. In aged primiparæ, atrophic degenerative changes in the cervical tissues, or hypertrophy of the portio-vaginalis, make the os reluctant to yield.

6. A certain degree of rigidity of the cervix is observed in connection with general tonicity and firmness of tissue, especially in young and robust primiparæ.

7. Last of all, we have a condition vastly more common than any of the others, and which is most frequently signified when the term "rigid os" is employed; we mean a spastic state of the circular fibers of the cervix; a trismus of the part; spasmodic rigidity. The others are instances of mere passive rigidity, or non-dilatability.

Generally speaking, spasmodic rigidity is an occurrence which exists quite independently of any diseased condition of the parts, and is, in fact, a purely functional lesion. It is found in various degrees of intensity, from that which causes but slight delay, up to the aggravated forms which hold out most stoutly against the measures adopted for their subjugation.

SYMPTOMS.—In the more obstinate cases of the spasmodic form, the os either refuses to dilate at all, or expansion advances to the size of a silver half-dollar or dollar, and remains unchanged for hours, or, in badly managed cases, even days, in a thin, hard and unyielding condition, notwithstanding the force exerted by the longitudinal and oblique fibers of the uterus to overcome it. It occurs most frequently in premature labor, when the cervix and lower segment of the uterus have not completed their physiological changes. It is commonly associated also with malpresentations. In some instances the lips of the os become œdematous and hypertrophied, and to the finger seem thick and tough, while the undilatability remains. Œdema occurs most frequently in stout plethoric women, at a time when pressure by the head has been long continued, especially after escape of the liquor amnii. It should not be confounded with a condition, somewhat similar, often observed in multiparæ during the progress of dilatation.

Spasmodic rigidity owes its origin to constitutional peculiarities, more especially a highly-nervous and emotional temperament, which can scarcely bear the ordinary pains of labor.

The sufferings of a woman during the period in which her cervix uteri is in a state of rigidity, are often intensely agonizing, just as in tonic spasm of muscles in other parts of the body. Madam Lachapelle considered severe pain in the loins as a valuable diagnostic sign of this condition.

It would appear from reports, that, in the practice of some, labor is complicated by rigidity of the os uteri in quite a large percentage of cases. Young practitioners are especially liable to such experiences. But, right here they fall into error, and upon this wise: They make an examination *per vaginam* during a pain, and find the os uteri with hard and rigid lips. "Surely," they say, "this is a rigid os," and they so regard it. Had they tested the condition of the part during the interval between contractions it would have been found pliable, perhaps to a marked degree.

After the pains have continued for a long time with but little, if any, progress of dilatation, they begin to lose vigor; the patient's tongue becomes spread with a dry, brownish coating, the skin hot, the pulse rapid, and the vagina and cervix hot and dry. Such symptoms are hastened by a dry birth, whether the waters have escaped through spontaneous, or through artificial, rupture of the membranes.

Further consideration is devoted to most of the other forms of rigid os uteri a little further on.

TREATMENT.—Immediate danger is not to be apprehended from a rigid state of the os uteri, and hence there is commonly no immediate urgency for more energetic measures than the administration of the indicated remedy. Later, if the condition persist, the woman may take a hot sitz-bath, for a few moments only, or a prolonged hot-water vaginal douche.

In the treatment of old-school physicians, *opium* is here regarded as the most precious remedy, and *belladonna* stands second.

Dilatation with Bags.—When the head remains high in the pelvis, and the membranes are unruptured, the finger cannot be used to advantage, or the mode of digital dilatation described below would be recommended. If our remedies have failed, it will then be necessary to resort to the caoutchouc dilators to accomplish the necessary expansion. Barnes bags are provided in different sizes. The smaller ones should first be used, and substituted by those of larger size as rapidly as expansion of the os will permit.

Manual Dilatation.—In these cases of spasmodic rigidity of the os uteri, digital dilatation may be safely and efficiently practiced. It should not be undertaken without resort having first been had to medicinal aid; but that failing, as sometimes it will, a careful, skillful, persistent effort with the fingers will generally accomplish the desired end. Explicit directions for doing this are not required; but we may say that, so long as dilatation of the os is but slight, we can best operate by drawing and pressing on the lips, in various directions, when room will soon be made for a second finger, and then, by spreading the digits, further dilatation can be secured.

Incision of the Cervix.—Vaginal Hysterotomy.—If all other means fail, as they rarely will, the cervix uteri may be incised in its circumference, with a blunt-pointed bistoury, in three or four places, to the depth of a quarter of an inch. Afterwards

the natural efforts will be sufficient to carry on the dilatation, or it may be promoted by judicious use of the fingers. The conditions demanding such treatment are exceedingly rare, and it should not be applied without due deliberation.

Use of the Forceps.—It is becoming the practice of the more advanced obstetricians to resort to the forceps in certain cases of rigid os uteri. Instead of following the old rule, to await full dilatation before using the instrument, a restriction which would exclude it in all instances of partially dilated os, they resort to the forceps, in obstinate cases, as soon as expansion is ample enough to admit the blades. The operation is especially called for when, as sometimes happens, a rigid os is associated with puerperal eclampsia. In some cases it is deemed wise to incise the os before applying the instrument.

In all cases wherein the forceps are employed before complete dilatation of the os, the greatest care is necessary. The forcible words of Blundell are here appropriate. "The grand error you are apt to commit, in using the long forceps, is *force*. In violent hands, the long forceps is a tremendous instrument. Force kills the child; force bruises the soft parts; force occasions mortifications; force bursts open the neck of the bladder; force crushes the nerves;—beware of force, therefore; *arte non vi!*" A gentle, cautious, but resolute effort with the forceps, in cases of rigid os which have resisted other means, will generally be rewarded with success.

Craniotomy.—If there is considerable pelvic contraction, or if, from other causes, the forceps are inadequate to effect delivery, the accoucheur may be driven to the necessity of employing that terrible instrument the perforator. Dr. A. K. Gardner gives expression to the following sentiments respecting the last two operations: "If, therefore," says he, "there be any immediate necessity for any obstetric operation, do it irrespective of the local condition; apply the forceps through an undilated os; perform craniotomy through a but partially dilated os; and even, if necessary, incise the os, in order to render an operation practicable." The conservative obstetrician will be very reluctant to use the perforator in such a case, and we verily believe that when properly managed, spasmodic rigidity will never create a demand for the operation.

Therapeutics.—Here is a functional disturbance constituting for the time an effectual bar to parturition, and to its correction our remedies are peculiarly adapted. Votaries of the old

school often fail to obtain the desired result with their heroic measures, but the homeopathic similimum, even in the highest potency, will unlock the spasm and again set the parturient energies into normal action.

Aconite.—This is the remedy when there is diminished moisture in the vagina, and the woman becomes restless, excited and thirsty.

Belladonna.—No remedy is so frequently indicated in spasmodic rigidity of the os as this. It is peculiarly suited to primiparæ, and especially those of the two extremes of age—the young and the old. Again, it is best adapted to women who are plethoric or are subject to vascular fullness of the head and face; the patient is irritable; labor-pains are unusually severe, but the patient bears them with considerable fortitude.

Local application of the drug does not materially aid its medicinal action.

Gelsemium.—For nervous, hysterical women; great agitation; women under the power of depressing emotions.

Caulophyllum.—We regard this as an excellent prophylactic of spasmodic action during labor, if the least tendency to it be observed. In our practice it is not employed in a routine way before labor, but is frequently administered at the beginning of the act. It is often indicated in women with rheumatic tendencies, and those with a history of sparing menstrual loss.

Calcarea carb.—Strange as it may appear to some, this remedy is of service in women presenting many of the indications for belladonna. The temperament and general appearance are nearly the same, save that, whereas the belladonna patient sometimes has a pallid countenance, the calcarea patient nearly always has it.

There are doubtless many other serviceable remedies, but the effective one is likely to be found among those which we have given.

Uterine Tetanoid Constriction.—It may occasionally happen, during labor, that progress is impeded by the occurrence of a circular tetanoid contraction of a limited portion of the muscular fibers of the uterus, above the internal os.

CHARACTER OF THE STRICTURE.—Hosmer likens the stricture to a band of metal; Davis says the uterus is "as if a strong rope had been tightly drawn around it;" and Gay says, "It felt as hard as bone, and at first was mistaken for bone." Dr. Reamy says: "Nothing which I had ever encountered in uterine

contraction could convey any idea of the power of the constriction."

DIAGNOSIS.—The stricture may sometimes be made out from careful abdominal palpation, but we are liable to confound the feel with that of premature and excessive retraction of the uterus, mentioned under the head of "Uterine Inertia." It will be distinguished from that condition mainly by the general characters of the labor, which do not point originally to weakness, but to obstruction. Then, too, vaginal examination does not reveal premature disappearance of the os uteri such as we get from retraction over the presenting part, though it must be remembered that this does not always accompany the anomaly mentioned.

TREATMENT.—The operations usually performed to overcome obstructions have generally been resorted to, but with most unsatisfactory results. Cæsarean section itself has been suggested. Such cases are rare, and we are not aware of the success which has attended the use of homeopathic remedies in their treatment, but we should expect good results from *belladonna, gelsemium, caulophyllum,* and perhaps *aconite*. It may be that *amyl nitrite* will prove efficacious. Chloroform has failed to unlock the spasm.

Atresia of the External Uterine Orifice.—There have been but a few cases of this form of obstruction reported. It is probably the result of inflammatory action, and has been known to occur after cauterization employed for endocervicitis.

Though these adhesions resist firm uterine contractions, and constitute a bar to labor, they may be broken up by the finger, with loss of but a few drops of blood.

Complete Obliteration of the Cervical Canal.—This is an extremely rare condition. It differs from simple agglutination of the external os chiefly in the greater strength of the adhesion, operative measures being required to overcome it.

Vaginal hysterotomy is the treatment required. If the site of the original opening can be found, an incision should be made with a bistoury, in a transverse direction, to the extent of half an inch. Or, the uterine tissues may be picked up with a pair of toothed forceps, and then divided with scissors.

Tumefaction and Incarceration of the Anterior Lip.—When descent of the head begins, as it frequently does, before

retraction of the cervical ring has taken place, the anterior lip of the os uteri may become compressed and held between the head and pubes. This condition usually disappears spontaneously, without becoming excessive; but now and then it will require relief.

Treatment consists in pressing upwards the tumefied part, in the interval between pains, and maintaining it in a situation above the brim, until the head descends far enough to prevent its return. Two or three attempts may be required to effect our purpose. Three precautions are to be observed, namely: (1) avoidance of much manipulative force, (2) dextrous use of the fingers so as not to cut the cervix, and (3) making sure that the case has proceeded so far that retraction of the anterior lip *ought* to occur.

Blot mentions a case in which the tumor formed by the anterior lip, thus confined, was an inch and a quarter thick, and descended to the vulva. The labor had to be terminated with the forceps.

Sanguineous tumors have resulted, which, upon rupturing either during or after labor, have created serious, and even alarming, hemorrhages.

In our efforts to avoid such a complication we should beware of too much, and too early, manipulation of the part.

Carcinoma of the Cervix.—The cervix uteri is the occasional seat of cancerous degeneration during the child-bearing period, and the result is extensive thickening and induration of the part. Carcinoma of the cervix, even in an advanced state, is not an absolute preventive of conception, but the latter rarely occurs, and even then manifests a strong tendency to terminate in fœtal death and premature expulsion. The vascular fulness and elaboration of pregnancy cause rapid development and progress of the disease.

Delivery is sometimes effectually obstructed, especially by the harder forms of the growth. When it does take place the cervical mass is fissured by the necessary expansion.

If artificial intervention be demanded, it may be found necessary to make repeated incisions into the cancerous mass with a view to provide for cervical expansion. Subsequently the labor may be instrumentally terminated, or left to the natural efforts. If, after making as free incisions as the degree of involvement will justify, the cervix is still too contracted to admit the forceps,—a thing which rarely occurs,—the choice of operative

procedure will lie between craniotomy and Cæsarean section. Cazeaux thinks that, so far as the maternal risks are concerned, they are about equal in craniotomy and Cæsarean section; and since the former involves certain death to the child, the latter is the preferable operation, in which conclusion we quite agree.

CAULIFLOWER EXCRESCENCE.—Growths of this character may arise from either lip of the cervix and finally come to involve the whole os.

A singular error in diagnosis, in connection with such a morbid development, occurred some years ago in the Lucerne hospital. It is said that one of the internes, to whom fell the management of a case of labor presenting a cauliflower growth with a pedicle an inch and a half in length, sent for his chief, M. Nelaton, to perform version, under the impression that he had a case of arm presentation.

When these tumors have been found so large as to prevent fœtal expulsion, they have sometimes been removed; while in others, craniotomy and laparotomy have been performed.

Thrombus of the Vagina and Vulva.—Effusion of blood into the pelvic cellular tissue surrounding the vagina and vulva constitutes a serious complication of labor. The location and extent of the involved area is determined by the anatomical structure of the part into which the extravasation takes place. In bad cases the effusion is not limited to a small area, but it may extend for a considerable distance, and acquire considerable size.

The accident is rare. Dubois had only three cases in 1,400 deliveries; Winckel one in 1,600, and Charpentier only one in 1,800.

The accident is usually developed suddenly in the latter part of labor, but does not commonly show itself till after delivery. Occurrence of rupture is heralded by severe pain, but it is not easily differentiated from the ordinary pain of a strong labor. Distension sometimes becomes so excessive as to occasion rupture of the integumental coverings, followed by considerable hemorrhage. When the extravasation takes place before labor, the resulting tumor may constitute a serious impediment to passage of the fœtus.

If the effusion is not excessive, it will likely be absorbed; but, when a large thrombus forms, rupture, suppuration or gangrene is quite sure to result.

TREATMENT.—When the thrombus is large, and lies in advance of the descending head, it will act as a formidable obstacle to spontaneous delivery, and, until reduced, may even forbid extraction with the forceps. In the latter case, free incision is the treatment, followed by immediate delivery. The cavity may then be temporarily packed with iodoform gauze, after thorough cleansing. When thus the hemorrhage has been checked, the wound should be closed with a continuous catgut suture, a single row of stitches being carried first through the



FIG. 218.—Cut showing Cystocele. *A* represents the prolapsed bladder.

depth of the wound in order to insure perfect apposition of the cavity walls.

In the cases which first present after delivery, the expectant plan of treatment should be adopted, unless the tumor is very large, or presents evidences of suppuration.

When the effusion is left to absorptive action, final recovery is more tardy than when it is removed through free incision. Over against this is Hervieux's statement that death has occurred more frequently under the latter treatment, but usually from hemorrhage which surgical skill should now be able to control.

Cystocele.—This is a frequent complication of labor, but

ought rarely to become a serious one. In neglected cases the bladder, by descent of the head, becomes divided into two compartments, and the lower one is pushed down in advance of the head. Still, it is evident that this can occur only as the result of inattention to proper evacuation of the viscus. If the part thus compressed is considerably distended, and does not receive suitable attention, it may offer decided resistance to advance of the head, and finally be overcome through serious injury.

Some authorities hold that the accoucheur is not always responsible for the development of this complication of labor, even though present from the beginning of the parturient effort, since the cystocele may antedate labor by weeks, months, or even years. Nevertheless we can but feel that, though an old cystocele may descend in advance of the presenting part and constitute an annoyance, it can be prevented from offering serious resistance, or falling into great danger of suffering severe injury.

Treatment consists in passing a soft rubber catheter and drawing off the confined urine. This should be done in the interval between pains, when the head is not pressing so heavily against the pubes, and, if necessary in order to secure room, the head can be repressed by the fingers. If the catheter cannot be introduced, the bladder may be punctured per vaginam with a hypodermic needle, or the small needle of the aspirator, and relief thus afforded. In any event there is no good excuse for allowing the organ to rupture under these circumstances. Even after emptying this compartment of the bladder, it may be necessary deftly to repress it from time to time.

Rectocele.—The posterior vaginal wall, including the recto-vaginal septum, may prolapse during labor, but it can scarcely constitute a formidable impediment, unless hardened fœcal accumulations are contained in the rectal pouch thus formed. Removal of such offending matters is usually accomplished with facility.

Vesical Calculus.—This complication of parturition has been met in a large number of recorded cases. When the stone is large, and it descends before the fœtal head, labor cannot be finished without its spontaneous, or operative, removal. In any neglected case, laceration of the bladder, and vesico-vaginal fistula are the almost certain results.

Diagnosis is readily made, for the stone, from its situation

and movable character, cannot easily be mistaken for any other complication of labor. These cases demonstrate the importance of timely vaginal examination, for when the stone is early detected, it can generally be pressed above the pubes, in which situation it is not so apt to produce mischievous effects. If the labor has advanced too far to admit of such treatment, or if the size of the stone is too great, the rule is to perform the operation of lithotomy through the vagina. If time and opportunity are auspicious, lithotrity is in some cases the preferable procedure.

Diffuse Swelling.—Swelling and tumefaction of the soft parts of the parturient canal are liable to complicate expulsion. In various forms of obstructed labor, as, for example, in deformed pelvis, the long continued pressure, and the repeated uterine contractions and muscular effort, give rise to the complication. A similar condition is sometimes noticed in connection with ordinary labor, due, probably, to intense hyperæmia and irritation. If excessive, hot water injections will bring about some reduction, but if the bladder and rectum are kept clear, little harm is likely to ensue.

Unyielding Hymen.—As mentioned in another place, women occasionally become pregnant through a cribriform hymen, and in other cases through one possessing but a single small aperture, and the structure, owing to its unusual toughness, remaining unbroken, forms an obstacle to delivery. Left to the natural course of events, these membranes, however hard, would probably be ruptured by the descending fœtus; but more or less delay and unnecessary pain would be suffered. It is far better to dispose of them by making a crucial incision, before pressure or strain has become excessive. It is probably better still, when such conditions are recognized during pregnancy, to make the necessary incisions at once, as there is no danger, and but little pain, attending the operation.

Uterine Polypi.—Polypoid growths springing from the uterus at the os, the interior of the cervix, or the cavity of the uterus, when they exist in the non-pregnant, commonly prevent conception; but there are exceptions to the rule. In other cases they are developed, or greatly augmented, during gestation, and, at the beginning of labor, emerge from the os uteri and act as impediments to the natural processes. When they arise from the lips of the os, they are usually of small propor-

tions, and of cystic character, offering no obstruction to labor. Those which spring from the interior of the cervix, or of the corpus uteri, are larger, and of a fibrous nature. Unless they are so large and unyielding as to constitute a positive bar to delivery, they should not be removed. The uterine contractions are sometimes forcible enough to detach them. Cystic polypi can be punctured with an aspirator needle, or a small trocar, and their contents drawn off.

It is occasionally possible to push the tumor above the

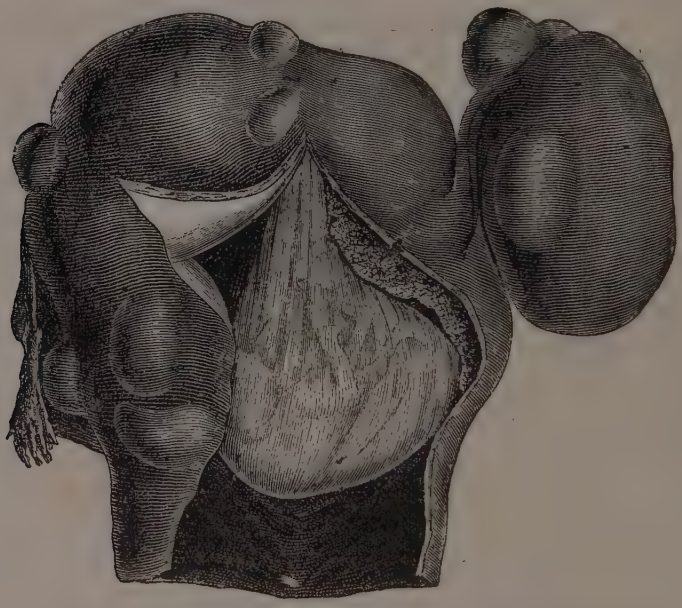


FIG. 219.—Multiple Fibroid Developments on the Gravid Uterus. (Charpentier.)

pelvic brim, out of the way of the presenting part, as has been demonstrated in numerous instances. This is sometimes practicable even where the conditions are extremely unfavorable. Mr. Spencer Wells relates a case wherein he was called to perform Cæsarean section, but succeeded in pushing the obstructing tumor above the brim, whereupon the fœtus passed with ease. Persistent effort, and considerable force, may be employed, when the impending dangers to both mother and child warrant the procedure. Before we attempt to operate, the woman should be deeply anesthetized.

If the tumor is hard, and cannot be pushed above the brim,

the next operations for consideration are enucleation and ablation. Such growths usually have loose attachments, and, when within reach, can often be enucleated. If this procedure is impracticable, they may be twisted off, or removed with the écraseur. Should neither of these operations be deemed expedient, the character of further treatment will be determined by the amount of obstruction, the operations in their order being forceps delivery, craniotomy, and abdominal section.

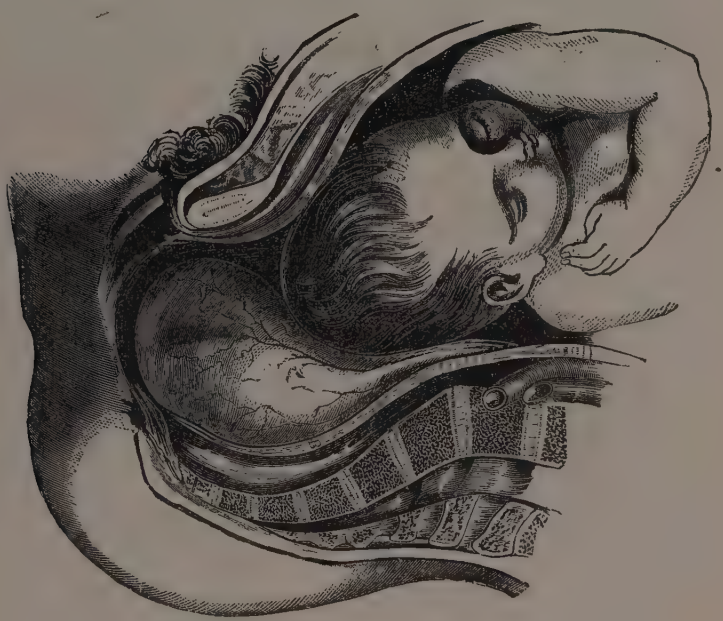


FIG. 220.—Labor impeded by uterine Polypus.

Hemorrhage after delivery has generally been regarded in these cases as strongly menacing, but fortunately it is not so common as might be expected.

Tumors of the Ovary Obstructing Delivery.—An ovarian tumor of considerable size cannot descend into the pelvic cavity, and hence will not become a serious obstacle to delivery. Those tumors which really do encroach upon the space which forms the parturient canal, are such as have previously attracted little or no attention.

We should distinguish between cysts containing fluid, and those with only solid matters. If the character of the tumor is

doubtful, no serious injury will be inflicted by an exploratory puncture with a fine aspirator needle, or small trocar. Playfair collected and tabulated fifty-seven cases of ovarian tumor obstructing labor, with the following results: In thirteen, labor was terminated by the unaided natural powers, but of this number six mothers died. With these he contrasts nine cases in which the tumor was diminished by puncture. The mothers all lived, and six out of the nine children were saved. "The reason," he says, "of the great mortality in the former cases is apparently the bruising to which the tumor, even when small enough to allow the child to be squeezed past it, is necessarily subjected. This is extremely apt to set up a fatal form of diffuse inflammation, the risk of which was long ago pointed out by Ashwell, who draws a comparison between cases in which such tumors have been subjected to contusion, and strangulated hernia; and the cause of death in both is doubtless very similar. This danger is avoided when the tumor is punctured, so as to become flattened between the head and the pelvic walls. On this account, I think, it should be laid down as a rule, that puncture should be performed in all cases of ovarian tumor engaged in front of the presenting part, even when it is of so small a size as not to preclude the possibility of delivery by the natural powers."

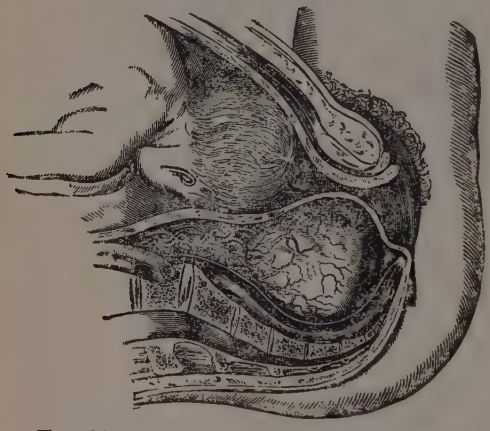


FIG. 221.—Labor obstructed by ovarian Tumor.

In five of the fifty-seven cases, the tumor was pushed above the pelvic brim, and the termination was in every instance in maternal recovery. It is a wise procedure, in all those cases where the contents of the sac cannot be evacuated by puncture, to make a persistent, yet not harsh, attempt to return the tumor to a situation above the pelvic inlet. Such treatment will sometimes succeed even under unpromising conditions.

Should both puncture and reposition fail, or be out of the question, craniotomy would be preferable to any attempt at

delivery with the forceps. In extreme cases, abdominal section may be the only mode of extraction.

Rigidity of the Perineum.—Rigid os uteri has sometimes associated with it, and augmenting parturient dangers and difficulties, a rigidity of the perineum, which owes its existence to a like cause. In most instances, the hardness is gradually overcome, and the perineum escapes without serious laceration; but sometimes the contraction is unyielding, and rupture the consequence. In general, the structures of the pelvic floor and outlet are softened during labor, by physiological processes, into a condition of elasticity and ductility, and the perineum yields before the advancing head, to the necessary degree, without much solution of continuity. On the contrary, we find that, in some instances, such softening does not take place, and, at the expense of structural integrity, the fœtus is allowed to pass. The latter condition is most frequently observed in primiparæ, and, hence, perineal rupture most frequently occurs in first labors. It is especially true of aged primiparæ, in whom there is usually a non-elasticity of the soft structures, uncommon in younger women. Old cicatrices, the results of former laceration, may impart a firmness to the perineum exceedingly unfriendly to its preservation.

CHAPTER XII.

PARTURIENT ANOMALIES REFERABLE TO THE MATERNAL OSSEOUS STRUCTURES.

Deformities of the Pelvis.—Without following closely the usual classification of deformed pelves, we shall consider, under the above title, deviations from the common form and size, whether the dimensions of the pelvic canal are uniformly changed, or are contracted in particular diameters.

LARGE PELVIS.—While the difficulties and pains of labor are considerably diminished in the case of enlarged pelves, the dangers are not correspondingly reduced. Mere facility of expulsion is not the most important consideration in connection with labor. When the pelvis is too roomy, dangers and complications of a different sort are liable to arise. These are such as accompany precipitate labor in general, and consist mainly of a dragging or forcing downwards of the entire uterus, from want of proper resistance of the pelvic walls, and hence rapid distension of the soft structures, with the consequent occurrence of cervical and perineal laceration. Among the dangers may also be mentioned strain and rupture of the cord from sudden expulsion of the fœtus with the woman in the erect posture, and uterine inversion.

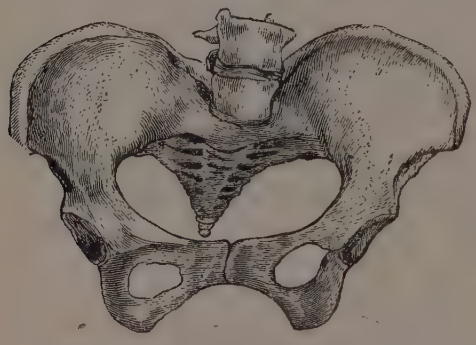


FIG. 222.—The Flattened (Rachitic) Pelvis.

SYMMETRICALLY CONTRACTED PELVIS, OR PELVIS ÆQUABILITER JUSTO-MINOR.—The general form of the pelvis may be symmetrical, the relative diameters remaining unchanged, but the structure small from equable contraction of all its diameters. These conditions constitute one of the most formidable obstacles to delivery. Fortunately such pelves are rarely met. They present an infantile type, and are doubtless occasioned by premature arrest of osseous development.

FLATTENED PELVIS.—The peculiarity of this form of pelvis

is its shortened conjugate diameter. The transverse measurement remains nearly or quite normal.

There are two varieties, differentiated by the causes which unite in their production. The *non-rachitic form* is the most frequent of all. The general conformation, as well as the individual bones, of such pelves are frail. The sacrum is depressed and pushed inwards between the two ilia, making the promontory still more prominent. A great degree of contraction is uncommon, the conjugate diameter rarely falling below three inches.

The cause of this deformity is not well understood. Lifting and carrying heavy burdens in early childhood, incompletely developed rickets, and retarded development, are regarded as sharing in its production.

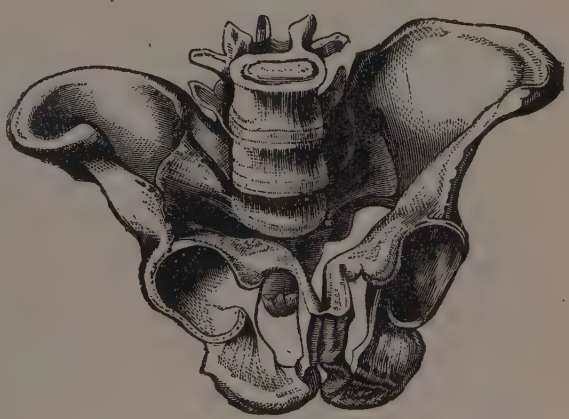


FIG. 223.—Malacosteon Pelvis.

In the *rachitic form of flattened pelvis* the bones are generally rather small, but sometimes compact and thickened. The ilia are flattened and spread. The sacral promontory is thrown inwards towards the pubic symphysis, and the base of the sacrum depressed between the ilia. The sacrum has a sharp curve forwards, at or about the fourth vertebra. The sacrum also loses its side to side curve. The transverse diameter of the brim is about normal. The horizontal rami of the pubes are flattened, and the acetabula are turned forwards. The ischia are spread, and hence the pubic arch is widened. Such a pelvis is contracted at the brim, and widened at the outlet, while its depth is diminished. Depression of the sacrum is plainly observable.

The proximate cause of these deformities is traceable mainly to the weight of the superimposed body on the pliable bones. Some of the changes, however, are probably congenital, some due to muscular action, and others to disturbances of growth and persistence of the fœtal type.

FLATTENED, GENERALLY CONTRACTED, PELVIS.—This variety closely resembles the justo-minor pelvis, and, during life, is not often distinguishable from it. The deformity is most frequently due to rachitis.

IRREGULAR RACHITIC AND MALACOSTEON PELVIS.—Rickets usually comes on before the child has begun to walk, and the weight of the body is thrown on the ischia instead of the acetabula. Malacosteon begins later in life, and the weight of the whole trunk is transmitted to the thigh bones through the acetabula. As a result of these varying conditions, a decided difference in the character of pelvic distortion is observed.

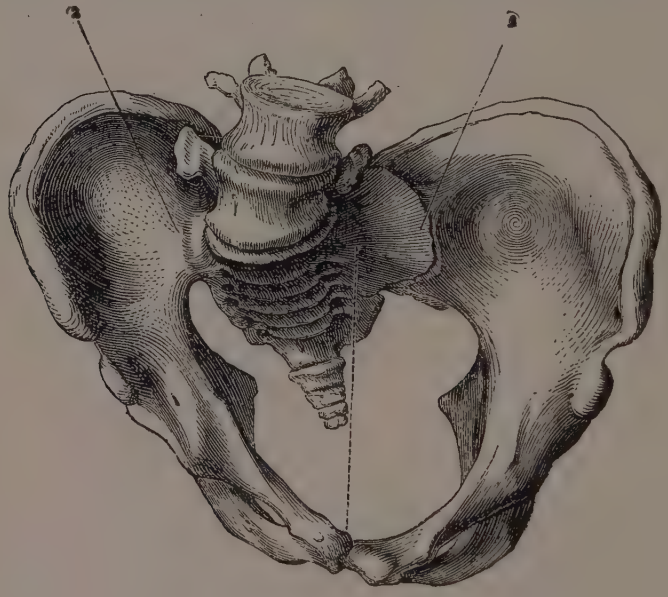


FIG. 224.—Obliquely-distorted Pelvis.

The most frequent of all the varieties of *rachitic pelvis* is that wherein the conjugate diameter of the brim is shortened by projection forwards of the sacral promontory, accompanied, or not, by depression of the pubes. Different varieties of distortion have been described, such as "masculine," "heart-shaped," and "figure of eight" deformities of the brim, all of them, however, preserving the general *elliptical* form.

In the *malacosteon pelvis* the general form is *angular*, occasioned by the depressions at the acetabula, growing out of the conditions before mentioned.

The characters of these two varieties of deformity are often blended. "These are," says Leishman, "mere illustrations of possible variations, which might be infinitely multiplied; but it is to be remembered that a considerable number of cases have been met with in which an undoubtedly rickety pelvis presented all the more prominent characteristics of malacosteon deformity." He also adds: "In so far as the true malacosteon pelvis is concerned, it has been well observed by Stanley that there is no diminution in the actual circumferential measurement of the brim, and that the bones are of their natural bulk and proportion, so that if their various doublings were unfolded, the pelvis would be restored to its normal dimensions and

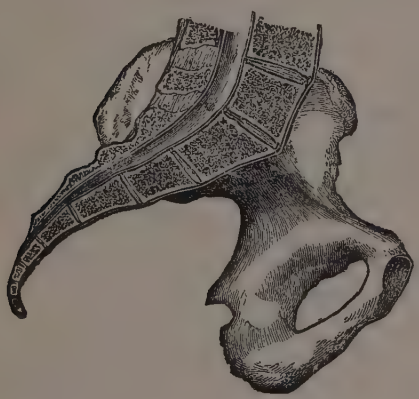


FIG. 225.—Flattening of the Sacrum.

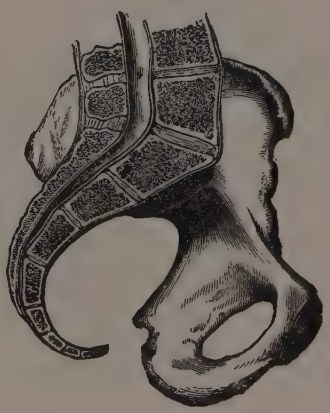


FIG. 226.—Exaggerated Sacral Curve.

form. In rickets, however, this does not usually apply, owing, as has already been observed, to the partial arrest of development which obtains during the course of the disease."

OBLIQUE OVAL PELVIS.—This distortion essentially consists in a deficient development and flattening of one side of the pelvis, of an anchylosis of the sacro-iliac joint of the same side, and of a depression of the sacrum towards the latter, while the symphysis pubis is thereby displaced so as to be nearly opposite the sacro-iliac synchondrosis of the sound side.

"Most of the cases of obliquely-contracted pelvis," says Hirst, "have been diagnosed after death; the entire number of cases observed is given as about fifty, but probably this is too small." Zweifel states that with a great difference between the two sides of the pelvis the diagnosis during life cannot be difficult.

Should there be delay during labor in the entrance of the head into the pelvis, the possibility of this deformity will be suspected if we find it impossible to reach the sacral promontory.

FLATTENING OF THE SACRUM.—A relatively more common form of pelvic deformity, sometimes associated with other distortions, and again existing independently of them, is flattening of the sacrum. On account of such a deformity, the head may become incarcerated in the pelvic cavity, and occasion much difficulty in delivery.

EXAGGERATED CURVE OF THE SACRUM.—The condition opposite to that just described is occasionally observed, consisting of an exaggeration of the sacral curve.



FIG. 227.—Robert's Pelvis.

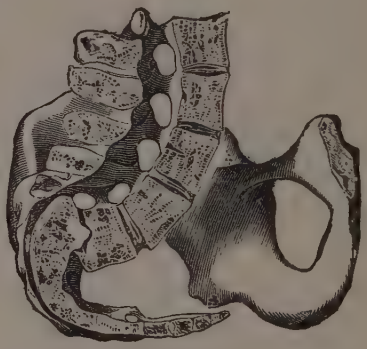


FIG. 228.—Spondylolisthetic Pelvis.

FUNNEL-SHAPE PELVIS.—What has been termed the "funnel-shaped" pelvis, in its general appearance bears quite a resemblance to the male pelvis. In such a specimen the diameters of the pelvic canal diminish from above downwards, and the head, when driven into such a pelvis, is liable to become impacted. Pelvic presentation in a pelvis thus deformed is almost invariably fatal to the child.

INFANTILE TYPE OF PELVIS.—From arrest of development, the pelvis occasionally preserves its infantile form, presenting a greater inclination of the brim, and a relatively great conjugate diameter.

DEFORMITIES FROM SPINAL CURVATURE.—The shape of the pelvis is considerably modified by spinal curvature, especially in those cases which originate in infancy or childhood. Thus both kyphosis and scoliosis have their peculiar pelvic modifications.

THE ANCHYLOTIC, TRANSVERSELY-CONTRACTED PELVIS.—In this form of pelvis the antero-posterior diameter is either normal or somewhat increased in its dimensions, while the transverse diameter, and especially that of the outlet, is diminished. At the same time there are bilateral sacro-iliac anchylosis, and absence, or rudimentary development, of the sacral alæ. The sacrum is narrow, especially at the base, and both its longitudinal and transverse concavities are nearly obliterated. This bone is also depressed, and its promontory is tilted forwards. The ilia are flattened, the descending rami of the pubes unite at an acute angle, and the ischial tuberosities are approximated. These changes decidedly increase the pelvic depth.

The cause of these peculiar modifications of form is probably found in arrested or imperfect development of the sacrum, followed by anchylosis of the sacro-iliac joints.

This is known as Robert's pelvis, because first described by Robert in 1842.



FIG. 229.—Pelvic Exostosis.

SPONDYLOLISTHETIC PELVIS.—This is a rare form of pelvic deformity, and consists chiefly in separation of the last lumbar vertebra from the sacral base, and descent of the lumbar spine into the pelvis, as shown in the accompanying cut, thereby greatly reducing the conjugate diameter. The patient's history will reveal an injury in infancy.

OSTEO-SARCOMA AND EXOSTOSIS.—These growths are of comparatively frequent occurrence. They originate from any part of the osseous tissue of the pelvis, but seem to prefer the upper third of the sacrum. The proportions which such a growth may attain are well shown in the accompanying figure. Pelves which present these growths are most frequently of the oblique-ovate, or of the rachitic variety.

OTHER OSSEOUS TUMORS AND PROJECTIONS.—Pelvic deformity may result from fractures of the pelvic bones, either by permanent displacement, or by the formation of extensive, or numerous, deposits of callus.

Cancerous disease, producing tumors of some size and consistency, may offer serious obstructions to labor. Their development is not confined to any particular part of the pelvic structure.

Osseous spiculæ sometimes exist, especially at the margins of the various pelvic articulations. The ilio-pectineal eminences, and the pubic crest and spine, may be prolonged and sharp. Such malformations are apt not only to impede labor, but to create uterine laceration.

ABSENCE OF THE SYMPHYSIS.—This rare form of pelvic deformity, termed "split pelvis" by Litzmann, consists in congenital absence of the symphysis, its place being filled by strong fibrous bands extending between the opposed surfaces of the pubic bones, or by the muscles and connective tissue of the perineum.

THE CHIEF CAUSES OF PELVIC DEFORMITY.—The diseases which constitute the main predisposing causes of pelvic deformity are Rachitis, or Rickets, and Malacosteon, or Osteomalacia.

Rachitis, as we have said, is a disease of infancy, developed most frequently during the latter half of the first year of life. It very rarely appears after the establishment of puberty. It is essentially a disease of perverted nutrition, affecting nearly every tissue of the body, but chiefly and most constantly characterized by a softening of bone, with resulting deformities. The osseous structures are markedly deficient in earthy salts, and the animal matter seems in some respects abnormal. The epiphyses are enlarged, and ossification at these points goes on in an irregular manner. The resulting deformities are not limited to any particular part of the body, but are most distinct in the long bones, the pelvic structures, and the spine.

The disease usually ends in recovery, but the resulting deformities, though sometimes modified by time, forever remain.

Malacosteon is in this country a rare disease. While it agrees with rachitis in the particular of bone-softening, it differs in the fact that it is a disease of adult, rather than of infantile, life. Its development usually begins in the puerperal stage, and is slowly progressive, each added pregnancy giving new impetus to the pathological changes.

The effects of the disease may be observed throughout the body, or they may be confined to individual bones. The pelvis and vertebræ are occasionally the only parts which suffer, especially when the disease develops in the puerperal state. According to

Schrœder, the disease is regarded as an osteomyelitis, which, beginning in the center of bones, advances towards the periphery, the essential pathological processes consisting in the absorption of calcareous matter through the Haversian canals, and the substitution of hypertrophic medullary tissue for the softened osseous structures. The result is that the bones become pliable and elastic, like rubber, and, eventually, even of wax-like softness.

But there are other causes of pelvic deformity, among which may be mentioned pelvic fracture with permanent displacement of all the bones; also the late establishment of puberty. Until the age of fourteen or fifteen years, the pelvis of the female differs in shape but slightly, if at all, from that of the male; but, as soon as the girl has her first menstrual flow, the pelvis begins to expand. If the appearance of menstruation is deferred to the age of seventeen, eighteen or twenty, the bones of the pelvis having become firmer, and the articulations anchylosed, without the pelvis having taken on feminine characteristics, the anomalies of form become permanent.

DIAGNOSIS.—A positive diagnosis of pelvic deformity can be based only on a direct examination; but valuable data which point to such a condition may be gleaned from inspection, and the *previous history* of the woman. When the infantile experiences were such as usually accompany rachitis, and especially if there are patent physical deformities which may reasonably be attributed to such causes, the case should be regarded with suspicion.

The history of previous labors will throw some light on the subject, and, if there were connected with these great difficulties and much suffering, we should suspect pelvic contraction as a contributing cause, and accordingly institute most thorough exploration.

The special appearances of the woman, unassociated with her history, may lend a strong probability to pelvic deformity. These are, briefly, a square head, pigeon-breast, small stature, spinal curvature, enlarged joints, and incurvation of the long bones of the extremities.

Exact measurements can be made only by means of instruments constructed for the purpose, termed pelvimeters. Numerous patterns have been devised, some of which are intended for external, and others for internal measurements, while some are designed for either mode of use. The internal dimensions are

those sought, no matter whether they be ascertained directly by measuring the cavity, or indirectly, and less accurately, by ascertaining the external size, and making allowance for the thickness of the pelvic walls.

In nearly all forms of pelvic distortion, the conjugate diameter is the one which is most contracted, and, hence, the instruments which have been devised, and the efforts which are generally made, have for their more especial object the determination of that measurement.

For external use, Baudelocque's calipers is probably the instrument in most common use, though Schultze's is much employed. For internal use Coutonly's, Earle's and Greenhalgh's are among the most prominent.

While it is only by means of such instruments that accurate measurements can be taken, practical ends will be well served by what has been termed manual pelvimetry. For the purpose of ascertaining the conjugate diameter of the brim, one or more fingers are introduced, and the point of the index or the middle finger is made to touch the sacral promontory, while the depth of penetration is marked by the thumb of the same hand, or by the finger of the opposite one. The fingers are then withdrawn, and the depth of introduction measured. A subtraction from this of half an inch is supposed to give the approximate conjugate diameter.

The transverse and oblique diameters of the brim may be approximately determined by introducing the four fingers of one hand and spreading them.

No special directions are required to determine the diameters of the pelvic outlet, as they are so immediately under visual and tactual survey.

Concerning pelvimetry, Depaul well says: "Notwithstanding the partial advantages offered by the pelvimeters, they one and all are open to objections which render them useless in routine practice. Of all the methods of measurement, that by the hand is certainly the least uncertain, inconvenient, and most exact in its results. We may thus measure the conjugate, and appreciate with sufficient exactness the length of the transverse and of the oblique diameters of the superior strait; all the more readily, of course, in the cavity, and at the inferior strait. Further, thus exostoses and tumors may be readily recognized. This is the method of mensuration almost entirely used in France, and abroad the tendency is to return to it. We cer-

tainly do not thus attain mathematical results, but the expert obtains figures precise enough for practical purposes."

INFLUENCE OF PELVIC CONTRACTION ON THE UTERUS DURING PREGNANCY.—In the early months of pregnancy the contracted pelvis favors dislocation of the uterus backwards. It is held down by the unusual projection of the sacral promontory, and a version is ultimately transformed into a flexion.

In the latter months, pelvic contraction, by preventing the customary descent of the lower uterine segment below the pelvic brim, maintains the organ in an unusually high situation, and therefore crowds the fundus hard against the

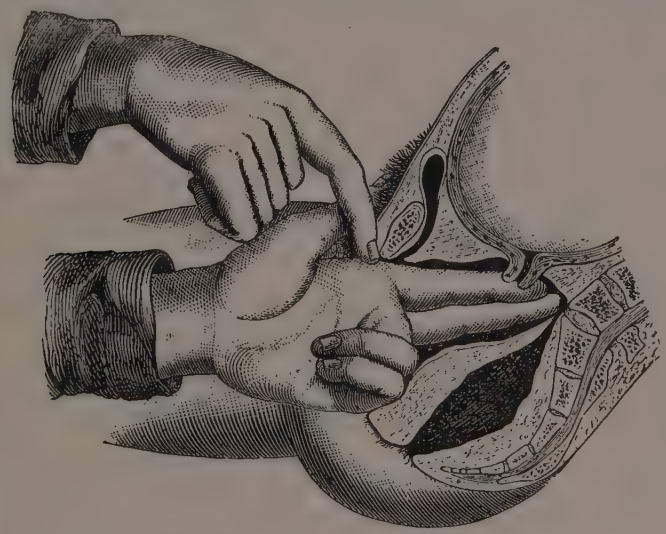


FIG. 230.—Manual Pelvimetry. (Zweifel).

stomach, as a result of which pendulous abdomen is sometimes produced.

INFLUENCE OF PELVIC CONTRACTION ON FŒTAL PRESENTATION.—Faulty presentations are relatively frequent in pelvic deformity. The following data gathered by Charpentier from Litzmann, Spiegelberg, Schrœder and Stanesco, give us a pretty clear idea of the frequency of the various presentations in this class of cases.

In 108 cases where spontaneous labor occurred	Vertex,	92
	Breech,	13
	Face,	2
	Shoulder,	1
In 47 cases where labor was ended by version	Shoulder,	31
	Vertex,	11

In 108 cases where labor was ended by forceps	Vertex,	102
	Face,	5
	Breech,	1
In 16 " " " " craniotomy	Vertex,	13
	Breech,	2
	Face,	1
In 46 cases premature labor was induced	Vertex,	34
	Breech,	8
	Shoulder,	4
In 90 where cephalotripsy was requisite	Vertex,	82
	Face,	4
	Breech,	4
In 4 Cæsarean sections	Vertex,	2
	Not stated,	2

In 414 cases, then:

Vertex,	336
Face,	12
Breech,	28
Shoulder,	36
Not stated,	2

Rigaud in 396 cases, with 404 children, gives the following figures:

Presentations of vertex	O.L.A.,	352
	O.R.P.,	100
	O.R.A.,	6
	O.L.P.,	2

The position O.L.A. includes the cases where the presentation was noted and the position not.

Breech cases,	29
Face,	4
Shoulder,	11

Considering together the statistics of Rigaud and of Stanesco:

	Infants.
Presentations of vertex,	696
" " face,	17
" " breech,	67
" " shoulder,	47
" " unknown,	2
Total,	829

INFLUENCE OF PELVIC CONTRACTION ON LABOR-PAINS.—When insurmountable obstacles are encountered by the natural forces, the uterus, from the vehemence of its contractions, is extremely liable to rupture. There is also unusual danger of the organ tearing itself loose from the vagina by its excessive retraction. After a time, in most cases, muscular action becomes weak, and lingering labor results.

INFLUENCE OF PELVIC CONTRACTION ON THE FIRST STAGE OF LABOR.—At the beginning of labor the head is high and the

lower uterine segment protrudes empty through the brim. The liquor amnii is driven downwards with force, but still the os dilates very slowly. The membranes are apt to break prematurely, when the os and cervix, which had been somewhat distended by the bag of waters, now relieved of dilative pressure seem again to contract. If the pelvic deformity be too great to allow the head to descend, the pains continuing, and help being deferred, some form of uterine laceration can hardly be escaped.

EFFECT OF PRESSURE ON THE SOFT PELVIC TISSUES.—The fœtal head is the only part which is capable of producing injurious pressure, unless the arrest should extend over a long period. In contracted pelves the most severe injuries are received at the brim. When the promontory is unusually prominent, and when there are spiculæ, or other irregular points of pressure, the uterine tissues, which in the first stage lie between the head and the brim, are often crushed and thinned, and, at times, even perforated and torn.

EFFECT OF PRESSURE ON THE CHILD'S HEAD.—The tumor formed on the fœtal cranium (caput succedaneum) is often large and bloody, and varies in location and form with the position and character of the contraction. The head also presents localized pressure marks, derived in most cases from the jutting promontory. If the pressure is not severe, the mere reddish lines which result will soon disappear, but in other cases they may be so deep and broad as to result in considerable destruction of tissue. These marks are commonly found on the parietal bones, since it is the biparietal diameter which in such cases is thrown into the pelvic conjugate.

PROGNOSIS.—Prognosis will, of course, depend upon the degree of deformity present. If the diameters are but slightly diminished, parturition may be tedious and laborious, but neither the maternal nor fœtal risk is greatly increased; but if the deformity is considerable, the prognosis must be correspondingly grave. The maternal mortality in these cases is at least twice as great as in normal pelves. The fœtal mortality is excessive. Combining the statistical tables of Stanesco and Rigaud we have a total of 667 cases which show the following results:

In pelves measuring 3.5 in conjugate diameter of the brim,—301 cases: Maternal mortality, 19.3; fœtal mortality, 25.33.

In pelves measuring from 3.5 to 3.1 in the conjugate of the

brim,—215 cases: Maternal mortality, 18.61; fœtal mortality, 48.37.

In pelves measuring from 2.7 to 2.3 in the conjugate of the brim,—93 cases: Maternal mortality, 22.60; fœtal mortality, 62.36.

In pelves measuring from 2.7 to 2.3 in the conjugate of the brim,—42 cases: Maternal mortality, 42.80; fœtal mortality, 90.5.

In pelves measuring from 2.3 to 1.9 in the conjugate of the brim,—16 cases: Maternal mortality, 50.00; fœtal mortality, 68.75.

TREATMENT.—Treatment of these cases involves not only the question of proper management after labor has set in, but also the question of advisability, in individual cases, of bringing about abortion or premature labor.

INDUCTION OF ABORTION IN EXTREME DEFORMITY.—When the contraction is so excessive that a viable child, of average size, cannot be safely delivered, early abortion should be induced. The fœtal life, in such a case, would not weigh a grain in the balance, since the possibility of preserving it is out of the question, and we are left to act in the interest of the mother only. Nothing can be gained from delay, and hence the dictates of wisdom would lead us to artificial interruption of pregnancy as soon as possible after its existence becomes manifest. There is no amount of deformity which can prevent the successful adoption of some of the means for its accomplishment placed at our disposal.

THE INDUCTION OF PREMATURE LABOR IN DEFORMED PELVES.—"The induction of premature labor," says Playfair, "as a means of avoiding the risks of delivery at term, and of possibly saving the life of the child, must now be studied. The established rule in this country (England) is, that in all cases of pelvic deformity, the existence of which has been ascertained either by the experience of former labors, or by accurate examination of the pelvis, labor should be induced previous to the full period, so that the smaller and more compressible head of the premature fœtus may pass, where that of the fœtus at term could not. The gain is a double one, partly the lessened risk to the mother, and partly the chance of saving the child's life.

"The practice is so thoroughly recognized as a conservative and judicious one, that it might be deemed unnecessary to argue in its favor, were it not that some most eminent authori-

ties have of late years tried to show that it is better and safer to the mother to have the labor come on at term, and that the risk to the child is so great in artificially induced labor as to lead to the conclusion that the operation should be altogether abandoned, except, perhaps, in the extreme distortion in which the Cæsarean section might otherwise be necessary. Prominent among those who hold these views are Spiegelberg and Litzmann, and they have been supported, in a modified form, by Matthews Duncan. Spiegelberg tries to show, by a collection of cases, from various sources, that the results of induced labor in contracted pelvis are much more unfavorable than when the cases are left to nature; that in the latter the mortality of the mothers is 6.6 per cent., and of the children 28.7 per cent., whereas in the former the maternal deaths are 15 per cent., and the infantile 66.9 per cent. Litzmann arrives at not very dissimilar results, namely, 6.9 per cent. of the mothers, and 20.3 per cent. of the children in contracted pelvis at term, and 14.7 per cent. of the mothers, and 55.8 per cent. of the children, in artificially induced premature labor.

"If these statistics were reliable, inasmuch as they show a very decided risk to the mother, there might be great force in the argument that it would be better to leave the cases to run the chance of delivery at term. It is, however, very questionable whether they can be taken, in themselves, as being sufficient to settle the question. The fallacy of determining such points by a mass of heterogeneous cases, collected together without a careful sifting of their histories, has over and over again been pointed out; and it would be easy enough to meet them by an equal catalogue of cases in which the maternal mortality is almost nil. The results of the practice of many authorities are given in Churchill's works, where we find, for example, that out of 46 cases of Merriman's, not one proved fatal. The same fortunate result happened in 62 cases of Ramsbotham's. His conclusion is, that 'there is undoubtedly some risk incurred by the mother, but not more than by accidental premature labor,' and this conclusion, as regards the mother, is that which has long ago been arrived at by the majority of British obstetricians, who undoubtedly have more experience of the operation than those of any other nation. With regard to the child, even if the German statistics be taken as reliable, they would hardly be accepted as contraindicating the operation, inasmuch as it is intended to save the mother from the dangers of the more

serious labor at term, and, in many cases, to give at least a chance to the child, whose life would otherwise be entirely sacrificed. The result, moreover, must depend to a great extent on the method of operation adopted, for many of the plans of inducing labor recommended are certainly, in themselves, not devoid of danger, both to the mother and the child. It may, I think, be admitted, as Duncan contends, that the operation has been more often performed than is absolutely necessary, and that the higher degrees of pelvic contraction are much more uncommon than has been supposed to be the case. That is a very valid reason for insisting on a careful and accurate diagnosis, but not for rejecting an operation which has so long been an established and favorite resource." The ideas of American obstetricians do not materially differ.

WHEN TO INDUCE PREMATURE LABOR.—The operation once decided upon, the period at which premature labor should be induced is a matter of the greatest importance. The tables which have been prepared to direct the physician in fixing upon the suitable time, while theoretically clear and precise, are of less value than we might expect them to be, because of the exceeding difficulty in estimating with accuracy the actual amount of contraction which exists in different cases. The table prepared by Kiwisch, which appears in various text-books on obstetrics, is as valuable as any:

	Inches.	Lines.			
When the sacro-pubic diameter is	2,	and 6 or 7,	induce labor at	30th	week.
" " "	2,	" 8 or 9,	" "	31st	"
" " "	2,	" 10 or 11,	" "	32d	"
" " "	3,	" ———,	" "	33d	"
" " "	3,	" 1——,	" "	33d	"
" " "	3,	" 2 or 3,	" "	34th	"
" " "	3,	" 4 or 5,	" "	35th	"
" " "	3,	" 5 or 6,	" "	36th	"

When expulsive action has been evoked, the treatment should be like that of labor spontaneously begun. In most instances the natural forces will be found adequate to the emergency; but in others the forceps, or turning, may be called for. As the result of most deliberate and judicious treatment, these cases may, in a large percentage of cases, be carried onwards to a conclusion favorable alike to mother and child.

When the conjugate of the brim is below two and three-fourths inches, the chances of saving the child by premature labor are too slight to be considered. Barnes proposed in some

cases to perform version in premature labor, especially if the pelvis measures less than three inches, and it has since been successfully done in many cases.

"*A Substitute for Premature Delivery.*—There are few general practitioners who have not found it necessary to bring on premature labor in cases of moderately narrowed pelvis. The idea of never being able to bear a living child is one that weighs heavily upon the unhappy subject of such malformation as will prevent the proper fruition of the marriage contract. The stigma attached to such incompetency is felt keenly by all right-minded women, and the attending physician is oftentimes worried by both wife and husband to bring on premature labor, and yet try to so gauge the time that a viable child may be born to them. This is a proceeding which, though often necessary, can never be undertaken without some hesitancy on the part of the attendant. Cæsarean section is as yet, notwithstanding the freedom displayed by laparotomists in exploring the abdomen, too dangerous a procedure to tempt either parent or surgeon to permit gestation to go on to full term, knowing that a living child cannot be born by the natural outlet. We have noticed from time to time methods pursued, in the feeding of parturient women, with the avowed object of rendering the bony structures of the child more yielding, so that the head would be more easily molded and expelled. Not much attention has been paid to such measures in this country, and, indeed, to the ordinary medical mind, the idea seems rather far-fetched, and not exactly scientific.

"Lately, however, some attention has been paid to this subject in Germany. T. Prochownick, of Hamburg, has been working in this line, and now lays down a dietary for such cases. His idea is that the child should be as free as possible from adipose tissue, yet still strong and well developed. By this method he has been able to bring to a successful termination, at full term, three pregnancies, although the pelvis was in each case very narrow. The children were strong and fully matured, but of very light weight. We regret that the actual measurements of the pelves spoken of are not given. It seems certain, however, that ordinary children could not have been born in either of the three cases.

"The diet, which was carried out for about six weeks preceding the time of the expected confinement, was as follows: Breakfast—A small cup of coffee, with a one-ounce roll; Dinner

—any kind of meat, eggs, fish with but little sauce, a little 'greens,' cheese; supper—about the same list as for dinner, with the addition of one and one-half to two ounces of bread, with butter as desired.

"The following are forbidden: Water, soup, potatoes, starchy foods, sugar and beer. For drink the patient is allowed from ten to fourteen ounces of red or Moselle wine daily. In this manner, which demands only a little strength of will on the part of the mother, the author hopes to obtain mature, healthy children, possessing some stock of resistance, in cases where the induction of premature labor would be otherwise unavoidable. Besides the general lack of adipose tissue in the three children mentioned, it was found that the cranial bones were more easily compressible beneath the thin and wrinkled scalp, and on this account the progress of the labor was rendered more favorable both for mother and child. After birth the emaciated appearance of the child was rapidly dissipated by the formation of the normal layer of fat."

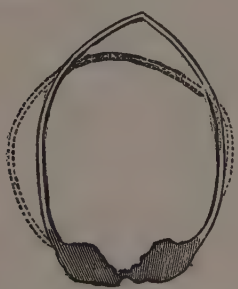
WHEN IS INTERFERENCE DURING LABOR ADVISABLE?—When labor has once set in, it becomes necessary, after a time, to decide upon the proper moment at which to adopt operative measures for the woman's relief. In the minor degrees of pelvic deformity, it is always proper to give nature a fair opportunity; but, if the uterine efforts are extremely violent, we should be careful not to allow the case to progress to the point of exhaustion. When the head is small, or the cranial bones unusually pliable, it sometimes happens, even in unpromising cases, that the head becomes so molded as to pass with perfect safety to both mother and child.

Cases Wherein Delivery of a Living Child at Full Term, Through the Natural Passages, is Possible.—In this category we mean to include flattened pelves with a conjugate of three inches and over, and justo-minor pelves with a conjugate of over three and a third inches. Below these figures, delivery of living children is rarely, if ever, possible. Our resources here are forceps and version.

In labor at full term the membranes must be most tenderly cared for in order to prevent rupture prior to fair dilatation of the os uteri. Obliquities of the uterus should be considered, and postural and other treatment resorted to for their correction. The pains should be stimulated when weak, and soothed when too strong. If after escape of the liquor amnii and close of the

first stage the head still refuse to engage the pelvic brim, the disproportion may usually be reckoned as considerable. Use of the forceps on a head which is too large to become engaged in the pelvic brim is hazardous even in the most skillful hands, and to be adopted with the utmost caution.* We should give the natural efforts a fair opportunity, and if the head finally becomes fixed at the brim, the forceps may be employed with every prospect of success. If nature be unable to accomplish fixation within a reasonable time, of which the physician must be his own judge, we may still use the forceps if the conditions seem friendly to such a mode of delivery, or we may have recourse to version.

Version.—Before deciding upon version we should be sure that the child is living, because the operation is to be made in its behalf. If it be found dead, perforation is the suitable





FIGS. 231 AND 232.—Change of Cephalic Form, from molding, in difficult head-last cases.

treatment. Version is indicated only when the fœtal heart pulsates with vigor, and the pelvis measures between two and three-quarters and three and one-half inches in the conjugate, with progressively increasing dimensions towards the outlet, and with an ample transverse diameter. The advantages derivable from turning in such cases have been set forth by Sir Jas. Simpson, and his views have been sustained by others.

It is but the revival of an old operation, but with its limits clearly defined, and its advantages perspicuously set forth. Simpson shows that the head viewed in transverse section is cone-shaped, its narrowest portion being at the base, repre-

* Dr. H. Williams has collected 119 cases reported since 1858, where the forceps were applied to the head above the brim, and finds that nearly forty per cent. of the mothers, and over sixty per cent. of the children, perished. We have had experience in four or five such cases, in which delivery of a dead fœtus was ultimately effected by means of version, but the mothers were fortunate enough to escape.

sented by the bi-temporal diameter, and its widest part above, represented by the bi-parietal diameter; the variation in diameters being from one-half to two-thirds of an inch. When the vertex presents, the broader part is in advance, and if the pelvic diameters are shortened, much greater force and much longer time will be required to drive the head through, than in cases of pelvic presentation, in which the lesser diameters descend in advance. Indeed, he shows that, in some cases, nature may utterly fail to drive the head through a contracted brim, and yet delivery be safely accomplished by version, with greater ease and less danger than by the forceps.

Other advocates of the operation, by further elucidation of the subject and the clinical application of these theories, have shown that it is possible to deliver a living child by turning through a pelvis contracted beyond the point which would permit a living child to be extracted by the forceps. Goodell, and some others, assure us that a living child may be delivered by version through a pelvis with a conjugate diameter of two and three-quarters inches, but other obstetricians of extensive experience, as, for example, Barnes, set the limits of the operation at from three and one-fourth inches upwards.

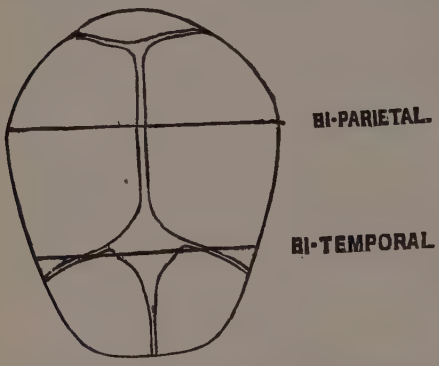


FIG. 233.—The transverse diameters of the Head as viewed from above.

From a consideration of all the arguments advanced on both sides of the question, and the clinical cases reported, it appears to be an established fact, that delivery of a living child may be accomplished in some cases of pelvic contraction, wherein both nature and the forceps have proved inadequate to the task.

We should not lose sight of another advantage to be derived from turning in such cases, namely, that pressure on the head at the brim, in the supra-pubic space, may be exercised by an assistant, and extraction thereby greatly facilitated.

Goodell and others place strong emphasis on the great advantage of antero-posterior oscillatory movements to be given the fœtal body while traction is being put upon the legs. By virtue of it, a powerful leverage is obtained, which must afford

decided aid in getting the head past the narrow strait. It is mainly by virtue of this that the extensive molding of the head represented in figure 234 is effected.

Nor should we in this connection forget that in some forms of pelvic contraction, one lateral half of the brim is more capacious than the other, in which case it may be possible to turn the occiput, in head-first cases, to that side, or, failing in such attempts, we may, by performing version, secure a favorable adjustment of the part to the anomalous outline of the brim.

In transverse presentation, version by the feet should be undertaken, whether there appears to be any possibility of saving the child's life or not, and if extraction cannot be accomplished, the after-coming head can be perforated.

TRACTION FORCE APPLIED AFTER VERSION, WITH RESULTS.—Charpentier de Ribes conducted some careful experiments with a view to determine the degree of traction force required in difficult cases of delivery through contracted pelves, after version. Fifteen times out of thirty-four, the head, at term, was brought through pelves measuring 2.9 inches by the use of a force varying from 45 to 66 pounds. In a pelvis of 2.6 inches, 5 times the head was extracted by a force of 66 to 121 pounds, and 6 times it could not be moved, although a force of 176 pounds was applied. Before term the maximum force used was 55 pounds. As for the lesions, in all the cases before term except one, the parietals were fractured; at term, the same, whenever the traction force exceeded 89 pounds. The maxillary bones were fractured in the fœtus at term whenever the force exceeded 55 pounds; before term when it exceeded 46 pounds. Lesions of the vertebral column, before term, at 88 pounds, at term 110 pounds. As elsewhere stated, Goodell says he has delivered a living child in this manner under a traction force of 100 pounds.

THE FORCEPS AND VERSION COMPARED.—Instead of entering into a recitation of the various arguments advanced by the advocates of these operations, we give a brief comparison of the operations themselves.

It is understood that passage of the head constitutes the principal difficulty. Now on the manikin it is clearly demonstrable, that, in equal degrees of contraction, it is incontestibly easier to effect delivery of that part by version than with the forceps.

It is quite true also in a living woman, with a dead fœtus,

that movements can be given the child, favorable to delivery, which the forceps will not permit. But in a living woman, with a living child, the case is different in a practical sense, and the chief element of distinction, and the one demanding special consideration, is found in the fact of fœtal life.

On the side of the forceps it may be said that traction can be applied with comparative safety for a period of at least a half-hour, while in the instance of version, delivery of the head, after this part engages the pelvic brim, cannot exceed five minutes with any degree of safety.

In using the forceps there is not only no demand for a hasty delivery, but we feel constrained to consume some time in order to protect the soft maternal tissues, and we can do so with the utmost safety to fœtal life. But in case of version there is urgent necessity for rapid delivery in the child's interest, and at some risk to the mother.



FIG. 234.—Molding of the Head at the brim in difficult cases of extraction after Version.

While version, then, affords greater facility for fœtal delivery, it measurably augments fœtal mortality.

These considerations should all enter into our judgment of the proper procedure in individual cases.

We conclude that version is preferable in all other presentations than that of the vertex, and is the procedure to adopt in those cases of the vertex which seem to offer some encouragement for the forceps, but wherein the forceps fail to effect delivery, unless further examination disclose the utter impossibility of extraction without perforation.

The forceps are preferable when pelvic contraction is not below three and a quarter inches, and the head appears to be of standard size; when the cord has not prolapsed; and when no serious impediment to perfect application of the forceps exists.

Following was the result of Scanzoni's experience in these cases:

	Forceps.	Version.
Mothers saved	94.7	85.7
Infants "	65.8	31.

When the natural efforts are sufficient, after due molding of the head, to force it into the pelvic cavity, further progress may be obstructed, or the pains may become weak, either condition bringing into requisition the forceps.

It is manifest that perforation will be required when, after version, we are unable to deliver the head, or when, in unchanged presentations, the head cannot be delivered from the brim, the cavity, or the outlet, by means of the forceps.

CASES IN WHICH A FULL-TERM LIVING CHILD CANNOT BE BORN, BUT DELIVERY THROUGH THE NATURAL PASSAGES IS ADVISABLE.—We have at our command in this class of cases but two operations, namely, craniotomy, and the induction of premature labor. The latter, of course, cannot be performed except in those cases wherein the condition of the pelvis is recognized for some time before the close of utero-gestation, and, hence, is limited to only a certain proportion of the cases which we are called to treat.

The question of inducing premature labor has been considered earlier in this chapter and does not require farther mention. Accordingly we shall discuss the treatment of such cases only as have gone to the close of normal pregnancy. "If labor comes on at full term," says Lusk, "before craniotomy is proceeded to, an attempt should be made to gauge the degree of disproportion between the head and the pelvic brim, for not only is it among the bare possibilities that a living child may be expelled through a pelvis measuring less than three inches, but it is to be borne in mind that in pelvic mensuration even the most expert may make errors of a quarter of an inch." * * * "Craniotomy should not be performed so long as the hope exists of saving the life of the child." An approximate estimate of the size of the head can be made by palpation of the hypogastrium, conjoined with the vaginal touch. We may learn still more by passing the half-hand into the vagina, which procedure, in such cases, is perfectly justifiable.

CASES WHEREIN EXTRACTION THROUGH THE NATURAL PASSAGES APPEARS TO BE IMPOSSIBLE.—In cases of extreme pelvic contraction, the natural forces are incapable of effecting delivery, and art offers but little hope either to mother or child.

When the degree of pelvic contraction is known in the early months of pregnancy, we are perfectly justifiable in producing an abortion. If left till a late period in gestation, the only operations open to our election are those necessitating laparotomy.

We should not omit to say, however, that in a few instances, craniotomy has been successfully performed in pelves with a conjugate of only one and a half inches. Dr. Parry collected seventy cases of craniotomy in pelves measuring two and one half inches, or under, but seven of them had finally to be terminated by Cæsarean section. Out of the whole number, forty-three survived. Notwithstanding these comparatively favorable results, we believe that the operator of limited experience and skill will be more likely to obtain favorable results from the improved Cæsarean section, or a modification of Porro's operation, in such cases, than from craniotomy.

Still we should make a distinction between cases by taking into account the transverse measurement, since craniotomy can be performed with much greater ease and safety in pelves with an ample transverse diameter, than in those equably contracted.

CHAPTER XIII.

PARTURIENT ANOMALIES REFERABLE TO THE FŒTUS, OR ITS APPENDAGES.

Plural Pregnancy.—"In general," says Blundell, "as we all know, women present us with a single child only; sometimes, however, they favor us with two, three, four or five at a birth, and their generous fecundity may even exceed this number. Sennert relates the case of a lady who produced at once as many as nine children, nor does this appear to be wholly incredible; and Ambrose Paré tells us of another lady, a co-rival of the former, I presume, who gave to our species no fewer than twenty children,—I do not say at a single birth, but in two confinements."

Twins are produced once in ninety or one hundred cases; triplets once in seven thousand, and quadruplets once in many thousands. There are but a comparatively few instances on record of five children at a single birth.

The sex of twins is divided, i. e., one boy and one girl in about one-third of all cases. Both fœtuses are boys in about thirty-five per cent. of cases, and girls in about thirty per cent.

Pathological specimens show that twin pregnancy may result from impregnation of two ova from the same or different Graafian follicles, or may originate from a single ovum with double vitellus. The ova may not only come from distinct follicles, but also from different ovaries. Then, too, it is quite probable that by super-fecundation, or even by super-fœtation, twin pregnancy may be produced.

Super-fecundation and super-fœtation are defined by Scanzoni; the former being where a second impregnation succeeds the first after an interval of varying duration, but before formation of the decidua reflexa about the first ovum; and the latter where a second impregnation takes place after the first ovum becomes completely inclosed by that membrane.

ARRANGEMENT OF THE MEMBRANES IN PLURAL PREGNANCY.—When twins are developed from two ova, each fœtus has its own chorion and amnion, but the two may have a common decidua, and the placentæ be united by their borders. If the points of original implantation be widely separate, the decidua reflexa and the placenta of each may be distinct. When the

development is from a single ovum, the placentæ may be fused into one mass, or there will be but a single organ with a bifurcated cord. The decidua and chorion are common to both, and in some cases the amnion as well. Twins from the same ovum are always of the same sex. In triplets it is common to find one child derived from an independent ovum, and two from a single one.

CONDITIONS ATTENDING INTRA-UTERINE DEVELOPMENT.—Twins at birth often present appearances differing greatly as to

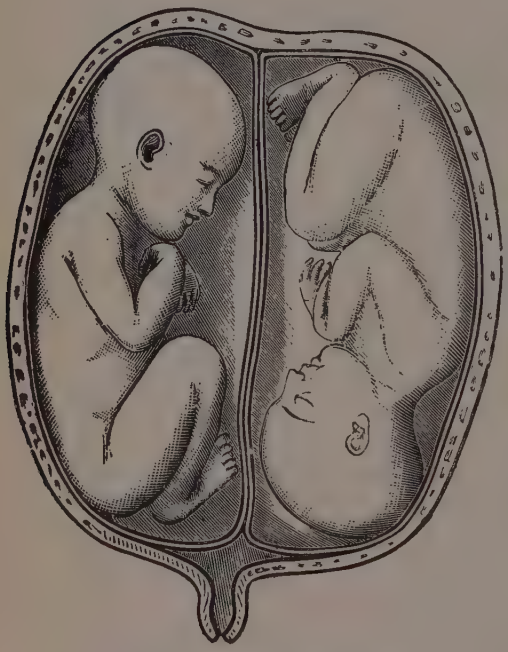


FIG. 235.—Twins lying laterally, one presenting by the vertex and the other by the breech. (Budin.)

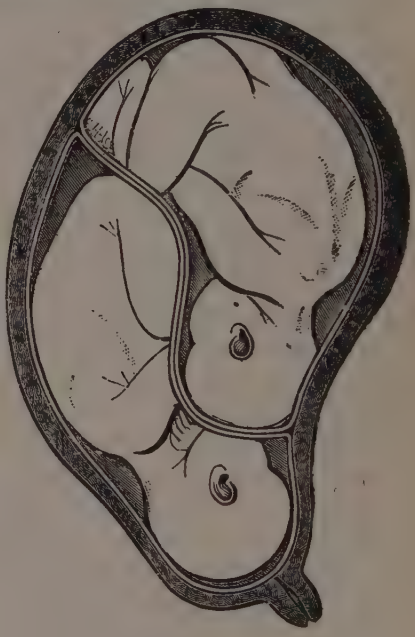


FIG. 236.—Twins, one anteriorly and the other posteriorly. (Budin.)

size and conformation. In other cases early death of one embryo takes place, but the dead and the living remain together till the full period of utero-gestation has been completed. As stated in another chapter, the dead fœtus is sometimes expelled, and without disturbing the uterine relations of its mate. Very rarely when both children are living, but when their rate of development has been different, the one which first reaches maturity is expelled, and the other is retained until its development

has become complete. Just what bearing these facts have upon the question of super-fœtation or super-fecundation we will leave for others to show.

LABOR IN PLURAL PREGNANCY.—The expulsion of the first fœtus is usually more tardy and difficult, because the second child makes every uterine effort awkward and unusually laborious. When the first child presents by the breech, the os uteri expands more slowly because the presenting part cannot be driven down with ordinary force against the lower uterine seg-



FIG. 237.—Twins, the inferior presenting by the breech, and the superior by the shoulder. (Budin.)

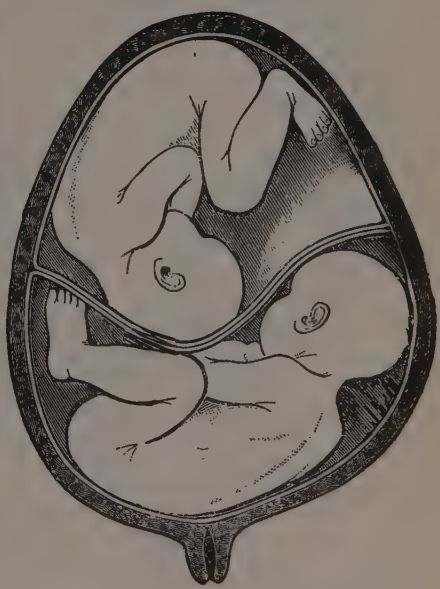


FIG. 238.—Twins, the inferior presenting by the dorsum, and the superior by the vertex. (Budin.)

ment, and descent of the trunk through the pelvic canal is slow for the same reason. Especial difficulty is met when birth of the trunk has been partially accomplished, since neither the contracting uterus nor the accoucheur's hand can press to advantage upon the retained head to aid delivery at the moment of greatest need.

MANAGEMENT OF THE FIRST BIRTH.—But few special directions are required for management of the first birth. The cord should be tied in two places and severed between the ligatures,

as is commonly done in single births. We have then to await renewal of uterine action, when descent and expulsion of the second child should be managed much like a case of single birth.

DELAY AFTER BIRTH OF FIRST CHILD.—In general, there is a brief interval of rest between the expulsion of the first child and renewal of uterine action for the expulsion of the second. Ordinarily, this interval does not extend beyond a period of fifteen or twenty minutes, but in some cases, hours, or even days, intervene. For cases wherein there is unusual delay, the plan of treatment has not yet become uniform in either theory or practice. Some regard any interference whatever, having for its object delivery of the second child, as "meddlesome midwifery," and to be discountenanced. Others recommend the medical attendant, after the usual delay of fifteen or twenty minutes, to rupture the membranes of the second child, if the presentation is natural, and stimulate the uterus to renewed activity. Later, if necessary to expedite delivery, instrumental aid is advised.



FIG. 239.—Twins, both lying transversely, one above, the other below. (Budin.)

In case of transverse presentation, or of face presentation wherein rectification is deemed advisable, it is agreed that the necessary operation should be performed without unnecessary delay.

If the presentation is either pelvic or vertex, the attendant need not go to either extreme, but give the uterus a reasonable time during which to recuperate its energies, so that, if spontaneous action does not ensue, the powers of the organ may be

aroused by suitable stimulation. If the membranes are unruptured, they may be broken after an interval of say an hour, when the case should be left to nature in the expectation that delivery will soon be undertaken.

Among the remedies suitable to the case at such a juncture of affairs, are those given under the head of uterine inertia.

Slight stimulation of the womb by careful manipulation of the cervix and kneading of the abdomen is permissible. If, despite these measures, expulsive action is not set up, the forceps may be applied, and delivery carefully effected under the strict precautions mentioned in the observations on treatment of uterine inertia. Version is preferred by some, inasmuch as the parts have been so well dilated by the passage of the first child that the requisites for successful delivery are well met. If the second child present by the breech, and there appear to be any necessity for urging the delivery, the usual management of such cases may be ignored and the feet brought down.



FIG. 240.—Head-locking. (Barnes.)

Exceptions to this plan of treatment arise under the following circumstances: 1. When the first fœtus and membranes have been fully delivered; and 2, when the fœtuses are known to be immature.

In the first instance we have no means of knowing with certainty whether the second fœtus is fully mature, and if not, its best interests will be subserved, and the mother's interests will not be prejudiced, by allowing it to remain undisturbed. In the second instance, knowing the fœtus to be immature, we are fully justified in making a certain degree of effort to bring away the membranes of the first fœtus, with a view to leaving the second fœtus behind for farther development.

LOCKED TWINS.—The presence of a second fœtus sometimes seriously complicates delivery. When both children present by the vertex, both heads sometimes attempt to enter the brim at the same time, and in this way farther progress becomes impeded. When the pelvis is capacious, or the heads are unusually small, both heads may even get into the pelvic cavity. Reimann mentions such a case, wherein he effected delivery, first of one head and then the other, the fœtal trunks following in similar order.

When both heads are discovered at the brim, the higher one

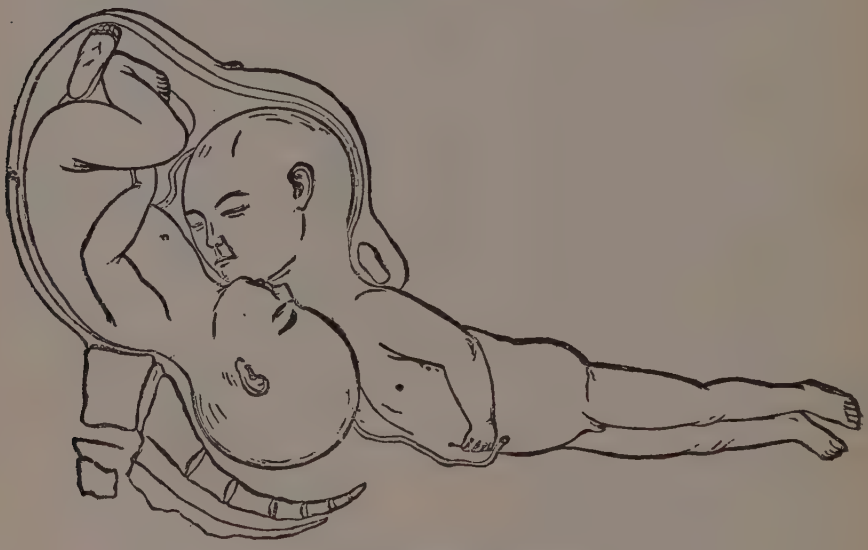


FIG. 241.—Head-locking. (Barnes.)

should be pushed away by means of combined manipulation, and the lower one permitted to descend into the strait.

When one fœtus presents by the head and the other by the breech, a more common, and no less serious, complication is liable to arise, in one case within, and, in another, above the pelvis.

When the heads lock within the pelvic cavity, the second fœtus can occasionally be drawn down past the first, and the tangle thus be undone. Failing in such an attempt, the upper head may be perforated and delivered, or it can be decapitated and left in utero until after delivery of the other fœtus.

When the heads lock above the pelvis, success by manipula-

tion is not impossible, but if it fail, decapitation of the head of that fœtus which presents will be necessitated.

DOUBLE MONSTERS.—When the bodies of two fœtuses are partially fused together, the management of delivery becomes a most responsible and difficult undertaking. Nature is generally equal to the emergency, as will be seen when we state that



FIG. 242.—Double Monster.

out of thirty-one collected cases, twenty were spontaneously and easily terminated. Such results are partially explained by the fact that in quite a percentage of all these cases labor is premature, while in others the fœtuses are dead and somewhat decomposed.

The Mechanism of Delivery.—The mechanism of delivery will

vary according to the character of the anomaly, but the chief difficulty is usually in the delivery of the heads. In head-last cases it is of prime importance to carry the bodies well forward over the maternal abdomen, in rational attempts at delivery, so that one head may enter in advance of the other.

In head-first cases, expulsion is commonly effected by the



FIG. 243.—Double Monster united anteriorly.

bodies performing a movement somewhat like that of spontaneous evolution in transverse presentation. The head and body of one fœtus passes, followed by the pelvis of the second in advance of the head.

When delivery of living children is impossible, the body of one must be mutilated to make room for the escape of the other.

The result to the mothers does not appear to be so disastrous as might be expected. Their dangers, however, are considerably augmented.

Intra-uterine Hydrocephalus.—Under this title we mean to include all the dropsies of the head, and all the extensive effusions or infiltrations of serum within or without the cranium; but inasmuch as external hydrocephalus is rarely of sufficient extent to constitute an obstacle to delivery, we shall confine our observations chiefly to the internal variety.

Hydrocephalus internus is a fœtal disease which complicates labor once in 3,000 births. In 43,555 labors, Madame Lachapelle observed but fifteen cases.

The causes are not well known, but among them we may mention alcoholism, syphilis, cretinism and consanguinity.

The redundant fluid may be found in four different locations, namely: (1) in the space between the duramater and the skull; (2) in the arachnoid cavity; (3) in the space beneath the arachnoid; and (4) in the cerebral ventricles.

It must be regarded as a serious complication of labor. Parturition is sometimes easy, sometimes difficult and sometimes impossible.

In seventy-four cases collected by Dr. Thomas Keith, uterine rupture occurred sixteen times.

Spiegelberg collected ninety-four cases with twenty-four deaths, and Poullet one hundred and six cases with twenty-one deaths.

Nor is this the only danger to which the woman is exposed. The head, when excessively developed, constitutes an insuperable obstacle to delivery, the uterus after a time becomes exhausted, and there supervene the dangers attendant on uterine inertia, not least among which, in neglected cases, is that of long-continued compression of the soft pelvic structures.

Diagnosis.—Playfair says that "the diagnosis of intra-uterine hydrocephalus is by no means so easy as the description in obstetric works would lead us to believe." * * * "As a matter of fact, the true nature of the case is comparatively rarely discovered before delivery; thus Chaussier found that in more than one-half of the cases he collected, an erroneous diagnosis had been made."

Whenever the labor is difficult, without other apparent cause than the size of the fœtal head, our suspicions should be aroused. These will be strengthened by separation of the pari-

etal bones at the sagittal suture. A positive diagnosis cannot be made without introducing the hand into the vagina, and the fingers into the womb; hence it should be regarded as not only the privilege, but the duty, of the physician, in suspected cases, —in fact in any case where the diagnosis cannot otherwise be clearly established,—thus to act.

"The unusual size and dimensions of the head might be thus ascertained," says Simpson, "but one source of fallacy is to be guarded against, namely, that the sutures and fontanelles are not, as was usually described, always preternaturally open and enlarged in hydrocephalic cases; for the cranial bones are in some instances, where the internal effusion is great, so largely and abnormally developed as to destroy this supposed pathognomonic sign, and to form an almost complete osseous covering for the enlarged head."

In most cases the cranium presents a fluctuating feel, so marked in some instances as in a degree to resemble the bag of waters, but communicating to the examining finger the hairy and thicker feel of the scalp. Still a hydrocephalic head has been perforated under the impression that it was the fœtal sac with unusually thick walls.

PRESENTATION, ETC.—Other than head presentations are exceedingly common in connection with hydrocephalus. Out of 152 cases collected by Scanzoni, 30 presented by some other part than the head. Poullet in 106 cases found only 65 vertex presentations.

When the pelvic extremity presents, the difficulties of the case are not likely to be realized until the trunk has passed the vulva and the head descends to the superior strait. Even then, though the character of the complication will probably be recognized, the precise cranial dimensions cannot be determined. The finger cannot reach far enough to make a thorough exploration, and examination through the abdominal walls is not at all satisfactory. However, if by conjoint manipulation,— one hand on the abdomen and the fingers of the other in the vagina,—the remarkable size of the head is made out, and further, if the body of the fœtus presents the shriveled appearance so generally observed in connection with intra-uterine hydrocephalus, diagnosis may be made with some degree of confidence.

TREATMENT.—In those fortunate instances of easy labor and vertex presentation in connection with hydrocephalus, no

special rules for management need be given. If much difficulty is experienced by the head in passing through the pelvis, the forceps will often afford efficient aid. When the cranial dimensions are too great to respond to such attempts at delivery, aspiration must be performed, or the cranial fluid drawn off with a trocar. After thus reducing the head, the forceps cannot be easily made to hold with sufficient firmness to effect

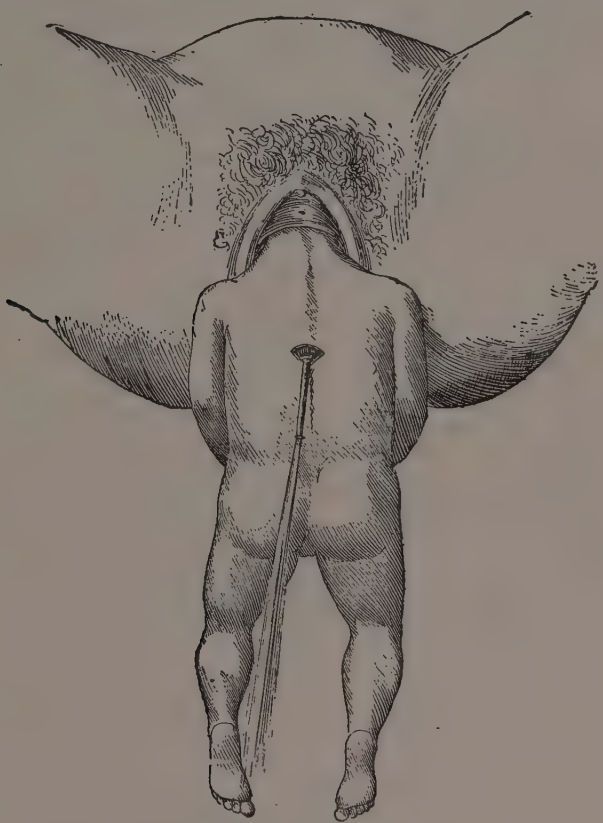


FIG. 244.—Pelvic presentation with Hydrocephalus. (Herrgott.) Tapping through spinal canal.

delivery. In case of failure with the forceps, the cephalotribe may be applied, or version may be performed.

When the pelvic extremity presents, and delivery of the after-coming head cannot be effected, perforation should be performed behind the ear,—a thing, by the way, not always easily done. Or we may resort to Van Huevel's procedure,

which consists in transverse section of the spinal column, opening the rachidian canal and through that drawing off the cranial fluid if it chance to be in relation therewith. When the fluid is not in the ventricles, a sound may be passed along the vertebral canal to the site of the accumulation within the cranium.

Hydrothorax.—This is a rare complication of delivery. It is indicated by enlargement of the thorax, widening of the intercostal spaces, and fluctuation therein. If distension is great enough to prevent delivery, paracentesis thoracis must be performed.

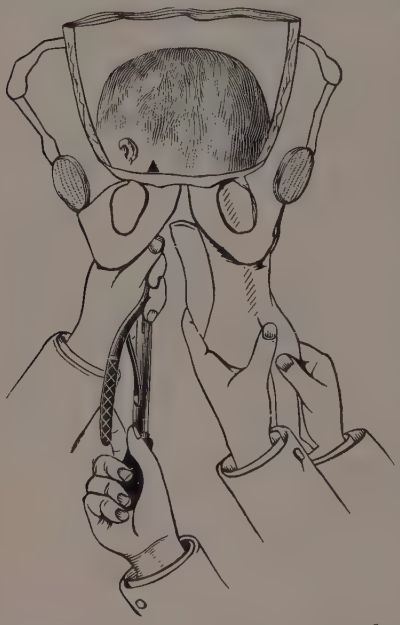


FIG. 245.—Mode of perforating the Head in pelvic presentations.

Ascites, and Vesical Distension.—Ascites is more frequent than hydrothorax. It gives rise to abdominal distension and fluctuation. Descent is accomplished, and a part of the trunk is expelled, when labor is arrested by the presence of a large, soft, fluctuating tumor which proves to be the distended abdomen. Tapping with an aspirator needle is the form of treatment to be adopted.

Vesical distension can rarely be differentiated from ascites in an undelivered fœtus. If the pelvic extremity is the presenting part, it may be found practicable to pass a small rubber catheter, and thus distinguish the one condition from the other.

Other Abnormalities of the Fœtus.—Fœtal tumors of various parts, such as spinabifida, hydroencephalocele, or hydrorachitis, as well as tumors of the liver, spleen and kidneys, may obstruct labor, but they are rarely large enough to do so. When their contents are fluid, they should be drawn off, if necessary; and, in the case of solid growths, evisceration may be required.

Other deformities of the fœtus, such as those presented by the anencephalus, acephalus and acrania, as well as those

having defective thoracic and abdominal development, with protrusion of the viscera, are rarely capable of proving obstructive to labor, but their anomalous features may render diagnosis difficult, and often impossible.

LARGE FŒTUSES.—While the average weight of the fœtus at birth is about seven and a half pounds, this is often considerably exceeded. What adds to the difficulties of labor in such cases is the strong tendency of large children to unusual cranial firmness and ossification.

When the head is too large to enter the pelvic brim with its usual facility, the same general principles must control the treatment which are set forth in connection with pelvic contraction. The forceps will usually,—we may say, nearly always,—be adequate to the emergency. In rare cases perforation will be required.

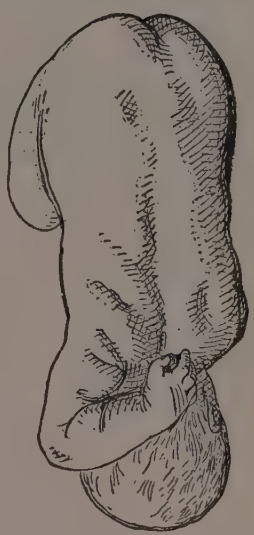


FIG. 246.—Dorsal displacement of the Arm.

When the trunk of the child is unusually large, delay is most commonly occasioned by the shoulders. When the head has passed the vulva and much time is lost in getting away the shoulders, fœtal dangers are greatly augmented. If the child is already dead, there does not exist the same urgent demand, and more deliberation is called for. In a few recorded cases it has been found utterly impossible to extract the trunk without evisceration.

A woman was recently confined by the author with her fourth child. The three former children were all still-born, and her medical attendant, a man of skill and experience, informed her that the cause of the stillness was in each case long retention of the trunk after cephalic expulsion. In the fourth labor a like complication arose, and only with the greatest difficulty were the shoulders extracted in time to save the life of the child, which for a time seemed lost through asphyxia.

Treatment.—Efforts at shoulder extraction in such cases are made under most unfavorable conditions. The pelvic outlet is usually so well filled that the fingers cannot reach the axillæ, while traction on the head is a dangerous procedure.

The first efforts should be to stimulate uterine contraction by abdominal friction, and slight traction on the fœtal head. These are usually sufficient. Should they fail, stronger traction may be made on the head, but not to exceed a few pounds, while forcible abdominal pressure should be exerted by an assistant. These combined endeavors will nearly always be crowned with success. We should not omit to say, however, that rotation of the bis-acromial diameter into the conjugate of the outlet is here almost a necessity, and it may be favored at first by rotary pressure of the fingers upon the shoulders, and subsequently by suitable traction with the fingers in the axillæ. The blunt hook is here sometimes serviceable as a tractor.

DORSAL DISPLACEMENT OF THE ARM.—In these really difficult cases the arm is applied to the side of the head so that its bulk is added to the biparietal diameter, while the forearm is flexed at the elbow and the hand lies behind the occiput.

It is to be treated by hooking the fingers into the bend of the elbow, and pushing the arm forward until it is finally made to sweep over the chest.

CHAPTER XIV.

PARTURIENT ANOMALIES REFERABLE TO THE FŒTUS OR ITS APPENDAGES—Continued.

Unavoidable Hemorrhage,—Placenta Prævia.—In order that one may obtain a clear conception of what is signified by the term "unavoidable hemorrhage," it is essential that he have a lucid idea of the anatomy, physiology and pathology of placenta prævia.

In pregnancy as it ordinarily exists, the fecundated ovum upon entering the uterine cavity lodges upon one of the shelves formed by the tumefied and rugose mucous membrane, in the superior portion of the uterine cavity, and at this point forms its attachments. Development here proceeds to full maturity, and as the os uteri expands in parturition, and the fœtus descends, the placenta, because of its favorable situation, suffers no necessary separation until after expulsion of the child, and the consequent termination of its functional activity. In other cases, happily few in number, the formative processes pursue an anomalous course, ultimating in great suffering and peril. The little egg, heavy with possibilities, eludes the prehensile forces of the superior portion of the uterine cavity, and sinks by its own weight to a lower point, where it lodges and soon contracts its placental relations. As fœtal supplies are all carried through the utero-placental circulation, a considerable basis of supply is established on the lower segment of the uterus, as a result of which the proportions of the part are augmented, and the walls thickened: small vessels becoming blood sinuses. The presenting vertex of the fœtus rests down on the placenta which is spread upon this part, and, when labor begins, with expansion of the os uteri there is more or less disruption of vascular relations.

The placenta, an organ of the utmost vascularity, occupies the lower uterine segment, covering the internal os uteri, and, as the maternal sinuses have been formed over and about the closed os, the very commencement of dilatation must begin the process of placental separation. As fœtal expulsion cannot occur without dilatation of the os uteri, and as the os uteri cannot expand without rupturing blood-vessels, there is set up a hemorrhage which is very appropriately termed "unavoidable."

VARIETIES.—The placenta, as a rule, is not situated precisely over the center of the lower segment of the uterus, but more or less to one side,—on the right, or the left, anteriorly or posteriorly. The nomenclature of placenta prævia correspondingly varies. Thus we have 1. Lateral placenta; 2. Latero-cervical placenta; and 3. Cervico-orifical, or central placenta.

For practical purposes we may make but two classes, the first being termed *partial, marginal* or *incomplete* placenta prævia, and the second, *total, central* or *complete.*

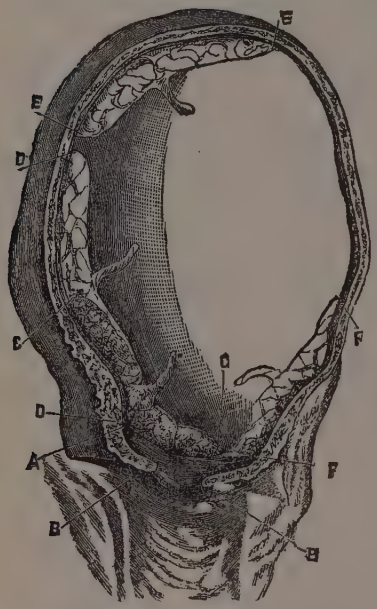


FIG. 247.—Varieties of Placental Attachments. *E E*, fundal placenta. *D D*, lateral placenta. *F F C B*, latero-cervical placenta. *A B B F*, seat of cervico-orifical, or central placenta.

FREQUENCY.—Placenta prævia is a complication of pregnancy and parturition encountered but once in about five hundred cases.

CAUSES OF THE HEMORRHAGE.—The causes which are proposed to account for the excessive hemorrhage in connection with placenta prævia have been matters of considerable dispute. The earlier, and usually light, losses which are in most cases suffered, have been regarded by some as accidental. This may be true in a small percentage of cases, but it can hardly be accredited concerning the phenomenon in general. The immediate causes of the bleeding which unavoidably takes place in placenta prævia were shadowed forth in the introductory observations, but here we may give them in detail. It is said that, during the first five months of utero-gestation, developmental energy is exerted more especially in the superior portion of the womb, during which period the cervical region is but slightly modified. Subsequently there is a change, we are told, and very soon the cervical canal is encroached upon by the capitulation of the internal os, so that for a considerable time before labor the os externum alone is left for future dilatation. In support of this theory, progressive shortening of the cervix uteri is cited. Hence, they say, as soon as

the cervical canal begins to expand by reason of the submission of the os internum, small arterial twigs in the utero-placental vascular system are apt to break, and cause hemorrhage which is soon arrested by the formation of coagula. This may repeatedly occur.

We have elsewhere taken occasion to express our want of concurrence in the theory upon which this explanation rests. We are convinced, from attentive observation of the phenomena involved, that cervical shortening is more apparent than real, and that the internal os uteri commonly preserves its contraction until near the beginning of labor. Hemorrhage in these cases may be due to the increased strain put upon the lower uterine segment after the sixth month of pregnancy, the uterine walls yielding to the force more rapidly than the utero-placental vessels, and thus giving rise to rupture of arterial twigs, or capillaries. It may also be true that in placenta prævia the anomalous development going on about the internal os makes it more patulous than in other cases.

But there comes a time when, through rhythmical uterine contractions, the cervical canal becomes at first funnel-shaped, and afterwards wholly expanded, so that the external os is left as the last part to yield. As expansion begins, blood gushes forth from ruptured vessels, but whether the hemorrhage is from the uterine or the placental side is still a question. It may come from both. The weight of opinion appears to be that the blood issues mainly from the uterine surface, though it cannot be denied that strong evidence has been adduced in favor of the opposite view.

SYMPTOMS.—The patient may be asleep, or she may be occupied in the performance of her household duties, when suddenly blood bursts from the uterus, soon followed, perhaps, by fainting, and sometimes, though rarely, by death itself.

In some women an occasional flow occurs for a number of weeks before the onset of labor. It comes profusely for a few moments, and then disappears, so that aid is not often secured in time to be of immediate service. The final hemorrhage sets in in like manner, and continues with uneven progress until arrested by well directed treatment, or brought to a close through utter exhaustion. In other cases there is no warning whatever. Gestation pursues an uneventful course, and, with animation and hope, the woman contemplates the near approach of the time when the restraints of pregnancy shall be

removed, and the trials and pains incident to its termination shall be succeeded by the tender delights of maternity, when suddenly she finds herself in the very valley of the shadow of death. There is a gush of fluid, which, on inspection, is found to be blood, and it pours forth in a sickening stream. If it continues, respiration becomes sighing, the pulse rapid, feeble, and finally absent, the countenance pallid and the extremities uneasy; syncope supervenes, and too frequently death ends the scene. The torrent may spontaneously cease for a time ere these extreme symptoms are developed, and the worst seem to have passed, when a renewal of the flow ensues and Death claims his victim.

For a time the uterus may act with its wonted energy, but excessive depletion is apt soon to paralyze its efforts. Occasionally labor hastens on its course, and, if favored by a passive and sparing flow, soon reaches a stage in which efficient pressure is laid on the bleeding surfaces, and the pernicious bleeding is brought to a close. In other cases, after the loss of a great quantity of blood the flow spontaneously ceases, not to return, and labor thenceforth takes a normal course, unless complicated by great weakness.

These are exceptional cases, for when the tide of vital fluid is not held in check by artificial means, or the conditions on which it depends are not rectified by judicious treatment, the fountains of life soon run dry.

Through energetic uterine action, in rare cases the placenta is separated and driven down into the vagina in advance of the fœtus. When this takes place before depletion has become too excessive, the outcome is usually favorable.

When the case is of the incomplete variety, there is sometimes but a moderate flow at the most, and even that is soon subdued by either natural or artificial means, and serious danger thereby averted. This result is explained by the slight extent of necessary separation, and the early descent of the presenting part into the pelvic inlet.

Post-partum hemorrhage is relatively frequent in these cases, growing out of inability of the lower part of the uterus to contract with sufficient force and persistency to control the bleeding vessels.

DIAGNOSIS.—However small a figure may be cut by diagnosis in certain diseased states and obstetric conditions, it is here of surpassing importance. The perils of the emergency, and the

possibilities of treatment are too great to tolerate anything less than most careful and thorough search for the conditions upon which hemorrhage before delivery depends.

The differentiation between accidental and unavoidable hemorrhage will be considered when we come to discuss the former complication of pregnancy, but we may also here glance at some of the more valuable diagnostic points.



FIG. 248.—Central Placenta Prævia.

As soon as the hemorrhage is gotten under control, we should investigate the history of the case, and learn whether there have been previous hemorrhages, under what circumstances the flow began, the possible influence of accident in developing it, and the position of the body at the moment when it set in. But it is only after a thorough vaginal examination that a positive diagnosis can be reached. The os will generally admit the finger, though it be not dilated, because of its

dilatability, a condition brought about mainly by the blood-loss. If the finger can be passed, we shall almost always be able to feel some portion of the placenta. If the implantation is central, we find the cervical canal covered by a thick, boggy mass, readily distinguishable from any part of the fœtus, and from a coagulum. Pressing upon this mass, we feel the resistance offered by the presenting part of the fœtus. When but a part of the placenta lies over the os, its spongy tissue will be distinctly felt, and, through the membranes attached to it, the fœtus will be clearly made out. On account of a high situation of the uterus we may not be able to make a satisfactory examination of the os and cervix without introducing the hand. There is a sensation of thickness and vascularity about the lower uterine segment not observed in normal pregnancy. Furthermore, the relation, in point of time, between the crimson gush and uterine contraction, should be attentively observed, since their simultaneous occurrence characterizes unavoidable, and not accidental, hemorrhage.

PROGNOSIS.—According to the calculation of Sir James Simpson, based on an analysis of 399 cases, one-third of the mothers, and over one-half of the children, were lost. Out of sixty-four cases recorded by Barnes, the maternal deaths were 6, or 1 in 10½. Read estimates the maternal mortality at 1 in 4½ cases.

The adoption of Braxton Hicks' method of version in the management of these cases, and the use of antiseptic precautions, have greatly reduced maternal mortality. Homeopathic statistics show a fœtal death-rate of 35.55.

During the five years ending with 1887 there occurred in Credé's Leipzic Clinic sixty-four cases of placenta prævia. Eleven per cent. of the mothers, and 55 per cent. of the children, died. Version by the combined method of Braxton Hicks, and slow extraction, were practiced in forty-nine cases. Excluding one case, in which the woman's condition was hopeless when first seen, the maternal mortality was but 2.1 per cent., while in the remaining fifteen cases treated by other methods it amounted to 33⅓ per cent.

Lomer had twenty-eight cases, treated by Hicks' method, with only one death. Among 190 cases occurring in German practice, only nine were lost.

Fœtal mortality in placenta prævia has not been much reduced. It is still above 50 per cent.

"The question of safety in labors with unavoidable hemorrhage," says Meigs, "is very much a question of time,—for if a woman with central implantation of the afterbirth could, as some have done, expel the child in one or two hours, she would not have time to die, inasmuch as the involution power of the womb would shrink the bleeding surface so speedily after the expulsion as to put an end to the flooding at once, and so to all dangers and alarm. On the other hand, where the woman continues in labor for four-and-twenty hours, she will probably die, either before or soon after its conclusion."

Life is not always destroyed as the immediate result of blood-loss; but a system thus rendered anæmic is far more likely to take on septic infection, and bedside observation has taught that septicæmia in the presence of anæmia is nearly always fatal.

The cause of the heavy fœtal mortality is obvious when we reflect on the sources of fœtal supply, and the entire or partial placental separation which occurs.

TREATMENT.—Upon clearly establishing our diagnosis, we ought carefully to consider the possibilities and probabilities of the case, and lay out a plan of treatment.

On reaching our patient we should first enforce the general rules of treatment for uterine hemorrhage; that is to say, we should allay fear, clear the chamber of all unnecessary company, and strictly enforce the horizontal position. If the advisable course of treatment is not at the moment clear, we may, if necessary, at once introduce a tampon to arrest the flow, though this is to be avoided if possible. Pressure upon the fundus uteri, which pushes the head firmly against the bleeding placenta, is sometimes of service as a temporary expedient.

The plan of treatment will depend somewhat on the period of pregnancy at which the bleeding occurs. If before the full term of gestation has been accomplished, the question of favoring fœtal expulsion has to be decided.

Following are the various methods of treatment for placenta prævia which have been proposed:

1. Treatment before moderate dilatation of the os:

Method of Guillemeau.....Accouchement force (1571).
Method of Greenhalgh.....Induced labor (1865).
Method of Leroux.....Tampon (1776).
Method of Barnes.....Use of Barnes' bags (1862).

Method of Puzos.....Rupture of the membranes (1759).
Method of Deventer.....Perforation of the placenta (1734).
Method of Dubois.....Administration of ergot (1836).
Method of Wigand.....External cephalic version (1812).
Method of Seyfert.....Vaginal injection (1852).
Method of Cohen.....Rupture of the membranes after separation of the placenta (1855).
Method of Barnes.....Partial separation of the placenta (1862).

2. Treatment after moderate dilatation:

Method of Simpson.....Total removal of the placenta (1844).
Method of Bunsen.....Partial removal of the placenta (1839).
Method of Kristeller.....Fœtal expression (1865).
Method of Braxton Hicks..Podalic version by conjoint manipulation (1864).
Extraction by the forceps.
Extraction by the hand (either with or without version).

We cannot enter into a detailed account of these various modes of treatment, but shall content ourselves with a consideration of the most valuable among them.

TREATMENT BEFORE MODERATE DILATATION OF THE OS.—*The Question of Inducing Fœtal Expulsion.*—In 1865 Dr. Greenhalgh, of London, recommended the induction of premature labor in placenta prævia, and though differing in their modes of procedure, obstetricians have come to accept it for some cases as a wise form of treatment. Erect as we may the strongest safeguards, yet the woman in whom the placenta presents is constantly exposed to great peril. At any moment, in waking or in sleeping hours, the torrent may gush forth, and the vital forces be speedily reduced to their lowest ebb. With the best facilities for summoning aid, life is continually in jeopardy. But, by the induction of premature labor, the entire process of parturition is brought under the physician's personal supervision, and the danger arising from hemorrhage accordingly reduced to a minimum.

Over against these considerations should be set others of no little weight. Firstly, and chiefly, stands the augmented fœtal danger which the operation involves. In response to this objection it should be said, that, though we should not be justified in ignoring fœtal claims, no conscientious protestant will deny that a fair and consistent view of their relative importance will always subordinate them to the maternal interests. In America it appears to have become a rule of practice to make the mother's safety in every particular paramount to all other considerations. Nor should we forget that, while induction of

premature labor is extremely hazardous to the fœtus, its chances of living under the expectant plan is little greater than those of dying. The favorable results of treatment by induction of labor are shown by Dr. King. Out of twenty-nine cases which came under his care before the days of antiseptic midwifery and the use of Hicks' method of version, there were twenty-three maternal recoveries, and eleven living children.

"I think, therefore," says Playfair, "that it may be safely laid down as an axiom, that no attempt should be made to prevent the termination of pregnancy, but that our treatment should rather contemplate its conclusion as soon as possible." We may make the single exception of diagnosis established before the close of the seventh month, in which case we would be justified in temporizing until a little later period, on behalf of the child.

Modes of Promoting Labor.—We have not here the same variety of means from which to choose that is offered under other circumstances, inasmuch as it is essential that, while we provide for the stimulation of uterine contractions and dilatation, we furnish an obstacle to the bleeding which is sure to follow. Instead of Kiwisch's douche and other slow processes which afford no protection from hemorrhage, we are compelled to resort to other means. The finger should be used as a dilator from the very start, up to the time when a Barnes bag can be introduced. But if the os uteri is very small, and the cervix is still hard in its upper portion, we begin by carefully introducing a tent, tamponing the vagina to hold it in place. As soon as this has accomplished its office, it should be withdrawn and superseded by one of Barnes' bags. The bag is introduced in a flaccid state, and afterwards dilated with water, and left until it can be followed by another of larger size. If we are merely promoting labor already under way, we begin with the bags instead of the tent. Hydrostatic expansive force, thus applied, nicely simulates labor, and, when done under strict antiseptic precautions, the operation can hardly be regarded as imposing serious danger. By thus filling the os uteri, and following its expansion, hemorrhage is kept within bounds, and labor is rapidly promoted.

As soon as dilatation has advanced to a certain point, artificial extraction becomes possible. The precise degree of expansion required will depend on the state of the os with respect to dilatability and the mode of delivery proposed to be

employed. The forceps can be used through an os uteri no larger than a silver dollar, and if the fœtal head can be gotten at, this constitutes the preferable means. In other cases turning by Hicks' method should be practiced.

Evacuation of the Liquor Amnii in the Management of Unavoidable Hemorrhage.—This expedient is by some regarded as almost uniformly efficacious; but it is unsuitable if there is a probability of our being obliged finally to resort to podalic version. The favorable effects of rupture of the membranes arise from increased uterine condensation, and augmented pressure of the presenting part against the placenta and the ruptured uterine vessels. To these should be added the stimulus which is imparted to the uterus, and the consequent acceleration of the parturient process.

This operation is best performed by means of a stiff catheter passed through the placenta, unless the membranes can be reached. Care should be taken not to wound the fœtal head. The evacuation ought to be thorough, to accomplish which it may be necessary to leave the catheter within the amniotic sac for some minutes.

When the liquor amnii is flowing away it will be observed that the stream ceases during a uterine contraction from the pressure exerted by the fœtal head, which is driven down with force against the lower uterine sagment and the pelvic brim. It is a similar action, as we have said, upon which we rely in these cases to arrest the flow of blood. The effect may be maintained between the pains by pressure on the fundus with the palm of the hand, or even by means of a firm abdominal bandage.

The Vaginal Tampon.—In the management of placenta prævia the vaginal tampon has been a strong reliance in times past, until the os attains a size which admits of the practice of internal podalic version. But the danger of introducing septic matter, even under the strictest precautions, has been clearly shown, and Hicks has brought forward his improved method of podalic version, these two working a change in notions and practice which is rapidly discrediting the use of the tampon. In a recent paper Hicks strongly condemns it, and Wyder writes in a similar strain. The latter says that the tampon is uncertain in arresting hemorrhage, is often the carrier of infection, and that the use of it, followed by version, is a great loss of time. Version is his remedy *par excellence*. We may say for our-

selves that in the several cases which have fallen under our care we have in only one instance had recourse to the tampon.

Following are the only indications for the tampon: Delay of the time when extraction, either manual or instrumental, can be practiced, with, meanwhile, a profuse flow of blood. Even then, however, we believe the use of Barnes' bags far preferable.

The best materials for a tampon are antiseptic cotton, antiseptic wool and iodoform gauze.

Thoroughly to pack the vagina the novice will find no easy task, and, if not thoroughly done, the operation is worse than useless. Before undertaking it the woman should be put into a favorable position across the bed, and the vulva thoroughly washed with an antiseptic solution. The vagina must also receive a douche. The perineum can be retracted either by the fingers, or a speculum, so as to admit the packing without serious irritation of the vulva and vagina.

The following most effectual mode of applying the tampon was first recommended and practiced by Dr. Sims. "The patient" (with empty rectum and bladder)," says Dr. Paul F. Mundé, in his *Minor Surgical Gynæcology*, "occupies the left lateral prone position; Sims' speculum is introduced and the cervix exposed. All coagula and fluid blood having been carefully removed by the dressing forceps and damp cotton, a disk-shaped tampon about two inches in diameter and one-half inch thick, is placed over the cervix. Another such tampon is rolled up and placed behind, another in front, and one on each side of cervix, and a large flat one over all these. These tampons are recommended by Emmet to be soaked in a saturated solution of alum and squeezed nearly dry. I always carbolize the tampons in a one per cent. solution, but think the alum solution a very good plan, as it contracts the vaginal pouch and thereby compresses the cervix. Occasionally it may be necessary to push a pledget of alum cotton into the cervical canal and thus arrest the hemorrhage until the whole tampon has been firmly placed. * * * The first circle and layer of tampons having been arranged, as described, and the vaginal vault thus filled and the cervix compressed in all directions, disk after disk of dampened carbolized cotton is laid around the circle of the vagina, filling up the center at the last, and each disk and each layer is gently but firmly pressed down and packed tight with the dressing forceps or a whalebone stick. This pressure should always be made from the periphery towards the

center, or rather from the anterior vaginal wall towards the sacrum. As the cotton is thus welded and pushed up, the room thus made is filled by new pledgets, until the vagina is distended to its utmost and the tampon has reached not only the floor of the pelvis, but is parallel with the pubic arch. After a final thorough survey of the tampon, and packing down any loose parts, the dressing forceps hold back the cotton firmly with wide-spread blades, and the speculum is carefully removed with point backward. Considerable care is required not to dislodge the tampon in the manœuvre, and it is necessary after removal of the speculum to fill the space thus made by a fresh packing tight of the whole tampon, and perhaps by several additional disks."

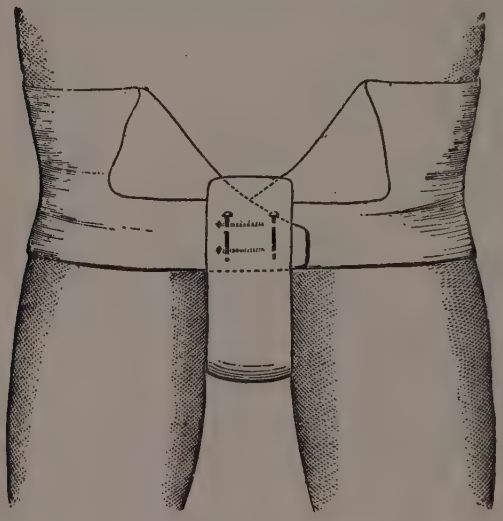


FIG. 249.—T bandage to hold Tampon. (Bailly.)

We believe the tampon to be much more effectual when a plug of alum is placed within the os and held there by the packing.

The tampon itself should be prevented from slipping away, by means of a T bandage.

SEPARATION OF THE PLACENTA.—This is a mode of treatment which has met with some success and favor.

Complete Separation.—Entire separation of the placenta as a mode of treatment, in certain cases, was first recommended by Simpson. He advised it more especially—

1. When the child is dead.
2. When the child is not viable.
3. When the hemorrhage is great, and the os uteri is not yet sufficiently dilated to admit of safe turning.
4. When the pelvic passages are too small for safe and easy turning.
5. When the mother is too exhausted to bear turning.
6. When the evacuation of the liquor amnii fails to arrest the hemorrhage.

7. When the uterus is too firmly contracted to allow of turning.

The practice was based on the theory that the source of the hemorrhage in placenta prævia is chiefly the separated uterine surface of the placenta; but, whether the theory be true or false, we sometimes find the operation a wise one. Complete separation of the placenta, however, is not easily effected, since the finger is not long enough to accomplish it. It may be done when necessary by introducing the half hand, or by careful use of a sound.

Partial Separation.—Barnes divides the uterine cavity into three zones, or regions. When the placenta occupies the upper or the middle zone, there is no unavoidable hemorrhage. But when the placenta is partially, or entirely, in the lower, or cervical zone, expansion of the os uteri to its full dimensions involves more or less separation and consequent loss of blood. If but partially within the lower zone, the placenta may not be entirely separated, but, after expansion of the os has been accomplished, contraction of the uterine tissues will take place and seal the exposed vessels without further hemorrhage from the remainder of the placenta which lies above the region of unsafe attachment.

Dr. Matthews Duncan assumes the limit of spontaneous detachment, as the result of uterine expansion, to extend two and one-fourth inches on every side of the center of the os uteri, and on the strength of this assumption Dr. Barnes has proposed a mode of treatment which is doubtless efficient in many cases, the description of which is given in his own words.

"The operation is this: Pass one or two fingers as far as they will go through the os uteri, the hand being passed into the vagina if necessary; feeling the placenta, insinuate the finger between it and the uterine wall; sweep the finger around in a circle, so as to separate the placenta as far as the finger can reach; if you feel the edge of the placenta where the membranes begin, tear open the membranes freely, especially if these have not been previously ruptured; ascertain if you can what is the presentation of the child before withdrawing your hand. Commonly some amount of retraction of the cervix takes place after this operation, and often the hemorrhage ceases. * * * If uterine action return so as to drive down the head, it is pretty certain there will be no more hemorrhage; you may leave nature

to expand the cervix and to complete the delivery. The labor, freed from the placental complication, has become natural."

In event of failure to arrest the flow by this means, he recommends the use of his "uterine dilators," otherwise known as "Barnes' bags."

A Full Bladder.—It is especially incumbent on the physician, in the treatment of placenta prævia, to see that the bladder does not become loaded with urine. The patient's anxiety and fear, coupled with the pain and distress she suffers, may so divert her attention that the discomfort of a full bladder will be disregarded. In no case, however, should she be permitted to arise or materially change her position in order to perform the required act of micturition. It is far better to use a catheter than to allow this.

TREATMENT AFTER MODERATE DILATATION OF THE OS.—We come now to consider the means of effecting delivery when once the os uteri has attained the state of dilatability which will admit of artificial aid, other than that already described. The character of the means suitable to the case will depend largely on the peculiar circumstances and conditions manifested in individual instances. In a certain proportion of all cases, the labor, from the moment of uterine dilatation, may be safely left to the natural efforts. The employment of the means for arrest or prevention of excessive hemorrhage before recommended, will often be so effectual as to obviate the pressing necessity for any further artificial interference. There is a point sometimes observed in these cases, beyond which to go would perhaps constitute "meddlesome midwifery." In the main, however, we find it necessary, in order best to conserve the patient's interests and rescue her from jeopardy at the earliest possible moment, to complete the delivery as rapidly as is compatible with the low state of the vital forces and the integrity of the tissues upon which the strain in rapid delivery mainly falls.

Ergot has been recommended and successfully employed in those cases wherein uterine contractions are too feeble to force the fœtus onward. We should refrain from exhibiting it if there still remains the possible necessity for version; if any obstacle to speedy expulsion exists, which could not be easily overcome by forcible contractions; or, finally, if the forceps are not under ready command, and the case is not clearly suitable to their use.

The Forceps.—The forceps, in dexterous hands, may be used early, and the woman thus speedily rescued from her perilous

situation. The conditions upon which the difficulty in using them in placenta prævia mainly depends, are, the height of the presenting part, the partial expansion of the os and the inaccessibility of the head from the unusual situation of the placenta.

It is often perplexingly difficult to apply the forceps to the head when it lies free above the pelvic inlet, and to do so it may be found necessary to carry the half-hand into the vagina to give direction to the blades. The spiral sweep of the instrument, as it enters, must be observed, in order to acquire a firm hold of the head, which part might otherwise be so displaced as to prevent a satisfactory application.

It is only under exceptional circumstances that we are justified in applying the forceps through an incompletely dilated os, and those attending unavoidable hemorrhage constitute an instance. They who have never passed the instrument through a small os will find, on attempting to do so, that, in point of difficulty, it far exceeds an ordinary application. To perform the act with success, the details of application, elsewhere given, are required to be observed.

The placenta, lying centrally, or laterally, over the partially expanded os, is a serious obstacle to this form of delivery. If the implantation is central, we may succeed in applying the instrument directly through the placenta, as has sometimes been done. To do so, an aperture must first be made of sufficient size to admit the blades. and then we may operate much as we would through a simple undilated os uteri. In such a delivery the placenta is likely to become loosened and be brought away in advance of the descending fœtus, in which case the result will practically correspond to separation and extraction of the placenta.

Incomplete placenta prævia is the form to which the forceps are more peculiarly adapted, as it is usually possible to turn aside the placenta and thus reach the fœtal head. To accomplish this the fingers should be slipped within the os uteri, and the direction in which there is least attachment carefully sought. Having found it, the placenta should be drawn aside, the membranes ruptured, and the blades passed.

It is unwise, as a rule, to apply the forceps through a rigid os uteri, but the co-existence of placenta prævia sometimes constitutes an exception. Hemorrhage may be continuous, and still the os, from exceeding nervous irritability, may be spasmodi-

cally closed. Ordinary measures for relief are, perhaps, tried in vain. If dilatation has reached a degree which will admit of the forceps being introduced, rather than to suffer longer delay we may carefully proceed to deliver. Traction should not be really intermittent in these cases, but remittent, to avoid the possibility of recurring hemorrhage from a relaxation of the pressure imposed on the bleeding vessels during traction.

VERSION.—Version, as a preliminary to extraction, in unavoidable hemorrhage, was first suggested by Ambrose Paré, and afterwards practiced and strongly advocated by Guillemeau. At present it is the most common mode of treatment, and some writers on the subject are so emphatic in their endorsement of it as to teach that every thought of placenta prævia should have the idea of version associated with it.

The conditions favorable to the performance of version by the internal method, as enumerated by Dr. Tyler Smith, are "a dilated or dilatable state of the os uteri; the retention of the liquor amnii, or a moderately relaxed state of the uterus; a pelvis of average capacity; the absence of dangerous exhaustion, or a temporary cessation of the hemorrhage." "Nothing," says Leishman, "is of greater importance than that the operation should be attempted as early as possible, for there can be no doubt that the great mortality which attends these cases is due, in no small degree, to an injudicious expectant treatment, while the precious moments pass during which alone we can save the patient's life and that of her child." In order, then, to improve the golden moment for operation, we must be on the alert from the earliest manifestation of untoward symptoms. When a concurrence of the above mentioned favorable conditions is met, podalic version may be easily performed; but the combination does not always exist, and then the difficulties are both numerous and formidable.

There are two modes of performing internal podalic version, differing in the precise manner of passing the hand. In one, the hand is pressed gently into the vagina, and then through the os uteri and the placenta which lies over it. In the other, instead of making an aperture for the hand through the placenta, this organ is raised on the side of least attachment. In case of complete placenta prævia, the hand is insinuated between the organ and the uterine walls, and then between the thin membranes and the uterus, until a point opposite the feet is reached, when the sac is ruptured, and the extremities are

at once seized. Serious objections to passing the hand through the placenta, as advocated by Dr. Rigby, have been raised by different obstetricians, and are concisely stated by Dewees as follows:

"1. In attempting this, much time is lost that is highly important to the patient, as the flooding unabatingly, if not increasingly, goes on.

"2. In this attempt, we are obliged to force against the membranes, so as to carry or urge the whole placentary mass towards the fundus of the uterus, by which means the separation of it from the neck is increased, and, consequently, the flooding augmented.

"3. When the hand has even penetrated the cavity of the uterus, the hole which is made by it is no greater than itself, and, consequently, much too small for the fœtus to pass through without a forced enlargement; and this must be done by the child during its passage.

"4. As the hole made by the body of the child is not sufficiently large for the arms and head to pass through at the same time, they will consequently be arrested; and if force be applied to overcome the resistance, it will almost always separate the whole of the placenta from its connections with the uterus.

"5. That, when this is done, it never fails to increase the discharge, besides adding the bulk of the placenta to that of the arms and head of the child.

"6. When the placenta is pierced, we augment the risk of the child, for, in making the opening, we may destroy some of the large umbilical veins, and thus permit the child to die from hemorrhage.

"7. By this method we increase the chance of an atony of the uterus, as the discharge of the liquor amnii is not under due control.

"8. That it is sometimes impossible to penetrate the placenta, especially when its center answers to the center of the os uteri; in this instance much time is lost that may be important to the woman."

Explicit rules for performing podalic version will be given in another place, and we shall here indicate only the general outlines of the operation as adapted to these cases.

By locating the sounds of the fœtal heart, we can determine with certainty towards which side of the mother lies the fœtal back, and thus make choice of the hand with which the opera-

tion can more easily be performed. Oiling the hand on its outer surface, it is passed within the vagina, and then slowly between the uterus and placenta, and the uterus and membranes, until it reaches a point opposite the child's feet. The membranes should then be ruptured and the feet secured and drawn downwards until version has been fully accomplished. After once the hand enters the os uteri, the hemorrhage is arrested by the temporary plug, consisting of the hand, the wrist, the forearm, and, ultimately (with a reversion of this order), the body of the child itself.

Podalic version, always a formidable operation, is doubly so in such emergencies, owing to the excessive depression of the vital force by which, in most cases, it is preceded

Many years ago the accoucheur was enjoined by Meigs, in his emphatic way, never to think of placenta prævia without at the same time thinking of podalic version, which he regarded as the form of treatment *par excellence*. The method of version then in vogue was what we now call the "internal," and this continued to be the one chiefly in use until a few years ago, when that by conjoint manipulation began rapidly to substitute it. In 1865, Braxton Hicks published a small work upon the subject of Combined External and Internal Version, which attracted wide attention. It was not until some time after this, however, that his method became extensively practiced. It is now generally recognized as the preferable mode of performing version in these cases, and version itself is still regarded as the best form of treatment.

One very great advantage to be derived from the Hicks method is the possibility of performing version by means of it much earlier in labor than by the internal method. A second important one is found in the avoidance of complete introduction of the hand within the uterus.

The woman upon whom it is to be undertaken should be put under anesthetic influence and drawn well to the edge of the bed, as in a case of forceps delivery. The hands of the operator, and the vulva and vagina of the patient, having been well cleansed with an antiseptic solution, manipulation is begun by introducing the half hand into the vagina, and the fingers within the os, while the other hand is placed upon the abdomen to aid in the manœuvre. It is not necessary that the os be wider than a nickel, or at the most, a silver quarter, just broad enough, in fact, to receive one or two fingers; but it

is not good practice to force a single finger through the os for this purpose. If the placenta is central, it may be necessary to push the fingers through it, but, if a margin can be reached, there the membranes should be ruptured and the manipulation begun.

Manipulation consists in pushing the presenting part upwards and to one side, while the opposite extremity is crowded downwards and towards the opposite side, until a foot can be reached and drawn through the vagina. It is neither necessary, nor usually advisable, to effect immediate delivery, but the body of the child should be brought down into the os so as to serve as an effectual plug, while at the same time it presses firmly on the separated placenta and controls hemorrhage.

Thenceforth the labor may be committed to the natural forces, reinforced, or not, by slight traction on the fœtal extremities.

The author of this method of managing placenta prævia has had great experience, and any instruction which he may give is entitled to peculiar weight. In November, 1889, he gave the following explicit directions concerning the treatment of this formidable complication of labor in its varying phases:

"I think we shall all agree: First. That when the placenta is inserted somewhere within the lower third of the uterus, there is very generally a liability to hemorrhage. It would be difficult to say that it is absolutely 'unavoidable,' because I have seen the placental edge a little over the os without the slightest bleeding, and doubtless there are cases of what is called 'accidental hemorrhage' which have occurred with a low insertion of the placenta. But I take it that for practical purposes, when the placenta is inserted about or over the os uteri, hemorrhage is to be expected before or upon the supervention of labor, whether premature or at full time.

"Second. Most of us will agree that when once hemorrhage has declared itself, there is no security for the patient, but that her life is in imminent danger from liability to recurrent bleedings.

"Third. My experience teaches me, that the relative position of the placenta to the os has no influence on the frequency or quantity of the blood-loss. In other words, whether it be marginal obstruction or central, the risk is the same.

"If you join assent with me so far, I would submit this proposition as a deduction from the foregoing, as a rule of

practice, namely, that as soon as we ascertain the case to be one of placenta prævia, we should make arrangements for terminating the pregnancy at the earliest possible time. As far as possible, we should not leave our patient, certainly not to an indefinite future.

"Our next consideration is, in what way and by what means we shall accomplish this. First, we desire to prevent further bleeding. Second, we wish to overcome the resistance the substance of the placenta presents to the passage of the fœtus.

"But also we cannot in the majority of these cases leave out of consideration the state of anæmia which the patient presents from the hemorrhage which has already occurred; sometimes so profound that the smallest movement, even ordinary examination, extinguishes the pulse. Of course, in all cases, it behooves us to carry out our manipulations with as much gentleness as possible, choosing, especially in the severer cases of anæmia, that plan the least disturbing.

"The bleeding can be stopped by pressure; either by tampon; by the head pressed down by the uterine efforts, or drawn down by the forceps; or by the leg and breech drawn down if presenting, or made to present by turning.

"With regard to the pressure by the tampon, I believe general consensus is against its use, and with this I am in accord; partly because, unless perfectly done, and this is difficult, it is of no use; and if perfectly done, it is very distressing to the patient, especially if it is necessary, which it often is, to renew it to avoid septic generation. Still, it has advantages, because by distending the roof of the vagina we also dilate the os, and provoke uterine action. But its action is tedious, and lacks the precision afforded us by the more recent method.

"But the uterine action alone will occasionally suffice to produce sufficient pressure on the inner surface of the placenta to stay bleeding, though it requires the head to be entering the os before it can efficiently do this; so that if we found the os uteri fully dilated, the placenta marginal and the membranes tense, we might rupture the membranes, and if the head descended we should not expect further bleeding, and the case may be allowed to end naturally. But practically speaking, these cases are not the most frequent. If the placenta were mainly over the expanded os when the membranes were ruptured, the head retarded by the bulk of placenta would not

effectively enter, and then it would be our best plan to press the flap of placenta aside, and apply forceps, drawing down head into os, retaining it there by gently hanging on to the forceps till the pains were sufficient to expel the head, assisting them by gentle traction.

"But it is very possible that we may have no forceps, and for one reason or another the head is unable to enter the os; then we are under the necessity, in order to place our patient in safety, to bring the breech to the os by turning. This can be accomplished by either slowly pushing the hand through the os, seizing the leg, and bringing the breech into the os; or by the combined external and internal version, effecting the same result in a gentler way. Of course, if the breech present originally all that will be needful will be to bring down the leg, fixing the breech in the os. The hand should retain hold of the leg, so that the weight of the arm gives pressure sufficient to prevent further bleeding. The great object of these manœuvers is to produce pressure enough to check bleeding, and this pressure need not be much. In both the employment of the forceps and in turning the action is not for instant delivery; as soon as the os is plugged by head or breech, the object is accomplished, a little additional traction, as the pains come on, sufficing for the delivery, which may be left mainly to nature. Thus we gain time, valuable to the patient, wherein we can sustain her energies, while the circulation recovers its balance. When the os is fully expanded, the engaging firmly of head or breech is followed in an hour or two by uterine action. Supposing the os is not sufficiently expanded to introduce forceps or to readily turn, then the os uteri can be expanded by the dilating bags, or, in the event of our not having them, the os could be gently dilated by the fingers introduced one by one. But if the os is so small as that, then I think the best plan would be to proceed by the combined method of version, as the leg and breech being of conical form it assists dilatation, and as the os expands it keeps up a corresponding pressure on the bleeding surface, for it has been constantly found in a large number of cases, that if very slight traction is kept up just at first no further bleeding has recurred.

"If with all these states of os uteri, particularly if small, the placenta be attached more or less across, it is of much advantage to separate gently the placenta for a forefinger's length. This very distinctly releases the lower portion of the uterus

from the restraint caused by the attachment of the placenta, and this is very noticeable if the margin of the placenta be across the os, because the margin is the part most firmly adherent to the uterus. At the same time the flap of the placenta somewhat retracts, and is pushed aside as the head or breech descends. If the membranes are perfect then they need not be ruptured till the act of version, and when this occurs a still further easement is felt in respect of the rigidity.

"Now with respect to the detachment of the placenta from around the os, the act of doing it may be attended with severe and continuing hemorrhage, particularly in central insertion of the placenta. In two cases which occurred to myself with central insertion, I was alarmed at the large flow, and this was only restrained by penetrating the center of the placenta, performing version and bringing the leg through the os, which was so small that scarcely two fingers could enter.

"I would call attention to the practical fact that sometimes in detaching the placenta we have severe bleeding, whilst at other times we may not; indeed, these cases are the more frequent, and it has practically been found that a free, bold detachment of the placenta, as far as the finger can reach, has the effect in a large number of cases of checking the bleeding for a time, and thus we come to another means of restraining bleeding in placenta prævia. But inasmuch as by this action we have the placenta partially detached, and as our experience tells us that both in 'accidental' and post-partum hemorrhage there is with partial detachment liability to floodings, so when we employ this method as one which will give us time by temporarily restraining bleeding whilst the os uteri is dilating, yet we must treat it as a measure itself requiring supervision. This my experience bears out. In other words, it is imperative that we should be in close attendance on the patient, ready to act should any bleeding of importance occur; the action indicated being of course either to bring the head down by forceps, or breech by turning. We must also remember when we detach the placenta we cut off the fœtus from its aëration to the same amount, and although it may be said that when it comes through the os about the same amount of placenta will be made useless by pressure, yet it may be rejoined that the effect of the detachment will generally extend many hours longer than that of the pressure. If the placenta be inserted more or less centrally, these considerations do not enter, for the placenta

sooner or later must be detached to an extent probably fatal to the child

"I would suggest here that in order to lessen the bleeding on detaching the placenta, the finger be kept close to the uterine surface, rather pressing it from the surface of the placenta than the placenta from the uterus. If this plan does not lessen the loss from the maternal side it will prevent loss from the fœtal villi, which must occur when we lacerate the placenta.

"Now there are a certain class of cases, practically the more numerous, in which there has been severe loss, and it is necessary to secure the safety of the patient, but where the os is so small that we cannot put in operation the foregoing plans, so also where, although the os uteri be somewhat expanded, we have at hand neither forceps nor dilating bags, or where in peeling off the placenta we are confronted with alarming blood loss; in these cases the only plan we have at command is version by combined internal and external method, and it is in these cases we see its great advantages. But when this method of version is used it must always be understood that it is not the version itself which is the hæmostatic remedy, but that by it we are enabled to bring the fœtal breech down on the placenta from within, and so are able at an earlier date than otherwise possible to stay the flow. It is possible in some cases to dilate the os with fingers, and after some time and with more or less force to pass the hand through the os and so reach the leg, but I feel quite sure that anyone who has tried the two plans will without hesitation pronounce in favor of version by the newer method, and it is interesting to note that, although very little or no uterine action was observed before turning, yet shortly after the leg has been brought in through the os the pains commence and continue, so that labor is accomplished without requiring much assistance from the attendant often within a couple of hours.

"In selecting our plans for the safety of the mother we cannot leave out of consideration the preservation of the child so far as possible; and here I think we shall all agree in choosing, where the state of the os, the position of the placenta, and the condition of the mother permit it, delivery by the head as the most likely to secure its safety, that is to say, with a fully expanded os and placenta marginal. But when the os is only large enough for two fingers, and the placenta much across the os or central, the time which elapses before labor is over, and

the great reduction of its aëration adds so much to its jeopardy, that the extra risk produced by pressure on its funis as the result of turning is scarcely to be taken into calculation. In either case the death-rate is very high. But if for any reason there has been laceration of the placenta there will also be laceration of the villi, and in consequence an oozing of blood will be going on serious to the vitality of the child, if it be free or continuing during long hours whilst we are waiting for the expansion of the os and pressure of the head, so that risk by pressure on funis after turning is, I think, pretty evenly balanced in the other mode by the loss of its blood. If after gently detaching the placenta just enough to set free the lower portion of expansion we quickly bring the leg or breech into the os, all loss from the placenta is checked, as it is at the same time from the maternal vessels. In all cases of placenta prævia before end of seventh month, and where we know fœtus is dead, of course the question of preserving fœtal life does not arise.

"In those cases where the anæmia is so profound that almost the least movement eclipses the pulse, our difficulties are very great, but whatever we do we must do it with extreme gentleness. Our first object is of course to prevent further loss while we sustain the powers by restoratives and till the circulation recovers its balance. If there be no bleeding we had better wait, but keeping watch at the bedside in case it return. Should it do so, or when the patient has rallied, we may elect to use forceps or combined version, according to circumstances. But as detachment of the placenta may be attended by more or less blood-loss, I should not advise this method. But these cases are so formidable, that often before we see them their fate is sealed, and while we are waiting for the rallying, already coagula in the heart have formed, and slowly but surely block the current."

When examination discloses a presentation of the pelvic extremity of the child, whether it be breech, feet or knees, we may vary somewhat the practice usually advised in such cases, by bringing down a foot. As the characters of the presenting part in placenta prævia are obscured by the interposed placenta, they cannot generally be made out until the time for interference arrives, and the hand is passed into the vagina for operative purposes. In pelvic presentation, we have, then, but to proceed and bring down a single foot, or both feet.

In the treatment of unavoidable hemorrhage during de-

livery, or before, we can expect but little aid from drugs administered in any form. If the woman's energies are broken, and the uterus is inactive, by the exhibition of *china, pulsatilla, secale, camphor,* or *caulophyllum,* some help may be given. *China* ought to be exhibited in every case of excessive blood-loss. If the os uteri is spasmodically closed, *belladonna, gelsemium, aconite,* or *caulophyllum* may mollify it. But none



FIG. 250.—Prolapse of the Umbilical Cord.

of these remedies can have direct influence over the hemorrhage itself, which constitutes the alarming symptom.

After labor our remedies will be of great service.

Prolapse of the Funis.—This is a complication which does not in any manner retard the labor or make it difficult, but what gives it significance is the danger in which its occurrence places the fœtus. A loop of the cord descends by the side of the presenting part, and is liable to severe compression between the fœtus and the pelvic walls. The consequence of such an accident is serious interruption of the fœtal circulation, and destruction of the child from asphyxia.

FREQUENCY OF OCCURRENCE.—It is not generally regarded as of frequent occurrence, but it is probable that moderate prolapse takes place in some cases without detection, and results in fœtal death. A loop of cord may descend far enough to suffer compression at the superior strait without being detected in an ordinary vaginal examination. It has been observed once in 300 or 400 cases.

Massmann estimated the frequency of the prolapse as follows:

In head presentations	0.67 or 1 : 150.
In breech "	4.70 " 1 : 21.
In transverse "	8.5% " 1 : 12.

Playfair and others have called attention to its remarkable prevalence in certain districts, attributing the phenomenon mainly to the unusual number of rachitic pelves in such places. As between France, England and Germany, it is least frequent in France and most frequent in Germany, the respective figures being 1 in 446½, and 1 in 207½, and 1 in 156. Simpson believed that these national differences are occasioned mainly by the varying positions in which women are placed during labor, but this interpretation of the causative influences which are responsible for such widely different experiences, seems to lack the strength of probability.

PROGNOSIS.—To the fœtus, prolapse of the funis is one of the most serious possible complications of labor. In 355 cases collected by Dr. Churchill, 220 children, or nearly two-thirds, died. These, however, were mainly hospital cases, and it may be that in private practice the mortality is not quite so great.

Out of 743 cases compiled from various authorities by Scanzoni, only 335 of the children were saved. Out of 202 cases of vertex presentation with prolapse of the funis, tabulated by another, only 76 children were saved.

It is evident that compression of the cord is the main cause of so heavy a death-rate; but some authors attributed it in part to partial loss of fluidity of the blood from being chilled as it passes through a loop of cord which protrudes from the vulva. This effect of exposure has been questioned by many, among them Madame Lachapelle, who says, "I have seen the cord hang out of the vulva for several hours together without the fœtus suffering therefrom in anywise, because there was no compression; and this, in some of the cases, notwithstanding the

patients had come a greater or less distance, either on foot or in some vehicle, from their residences to our hospital." The writer has likewise recently delivered a woman in whose case the cord had been prolapsed for two or three hours, and when felt, seemed cool and pulseless, and still the child, though feeble, was easily revived.

It is evident that the prognosis depends on a variety of conditions, among which we may mention, the nature of the presentation, the degree of descent, the period in labor when it occurs, the state of the membranes, the interval between the occurrence of prolapse and its recognition, and the method of treatment employed.

CAUSES.—Prolapse of the funis results from a variety of causes, among which are unusual length of the cord itself, a redundancy of liquor amnii, irregularities of the pelvic brim, obliquity of the long uterine axis, positions and presentations of the fœtus which do not occupy the full outline of the pelvic brim, and low attachment of the placenta. In the front rank of proximate causes we must place sudden and rapid escape of the liquor amnii. In most cases of labor, the presenting part presses well down on the brim, and rupture of the membranes during a pain is attended with escape of only that part of the amniotic fluid which is confined below. But, in other cases, the presenting part does not rest at the brim with so firm and equable a pressure, and when the bag of waters breaks, a large part of the liquor amnii escapes with a gush, and may bring down with it a loop of the cord.

SIGNS OF FUNIS PRESENTATION.—The signs of prolapse of the umbilical cord are usually sufficiently well marked to make diagnosis easy. Descent is often so great that a loop of the cord, three or four inches in length, protrudes from the vulva. Pulsation may be present or absent. When present, it is sometimes so feeble as almost to escape detection. If pulsation be distinctly felt, this alone will establish the diagnosis. If absent, the twisted arrangement of the vessels, always plainly felt, or visual examination, will remove all doubt. When only a piece of the loop can be felt at the brim, it may be mistaken for a finger or toe, unless the examination be pressed. It seems hardly credible, but a loop of intestine, prolapsed through a rent in the uterus, in more than one instance has been mistaken for the umbilical cord.

When only a knuckle of the cord drops down below the brim,

it is so small that it may escape attention, and the child be sacrificed through neglect, without a suspicion of danger.

HAS PULSATION CEASED?—It is of the utmost importance that, in prolapse of the funis, we determine whether or not the cord be pulsating, since if pulsation has actually been absent for say fifteen minutes, we are safe in assuming the child to be past recovery, and need resort to no interference on account of the complication. Mere inability at once to detect pulsation is not sufficient ground upon which to rest the expectant treatment. It is remarkable how soft and indistinct are the pulsations in some cases, as the author has recently had occasion to observe. It should be remembered in this connection that an examination of the cord made during a pain is liable to mislead, as compression at such a time may be sufficiently great to interrupt the circulation, while in the interval between pains circulation may be unimpeded.



FIG. 251.—Inclination of the Uterus, in the dorsal posture, favoring descent of the Cord into the pelvis.

TREATMENT.—Prolapse of the umbilical cord constitutes a real emergency, inasmuch as even a brief delay in affording relief may be fatal. The obvious aim of treatment is to prevent or relieve compression of the cord, which may be accomplished through the following means:

1. Prevention of descent in threatening cases;
2. Reposition of the cord when prolapse exists;
3. Protection of the prolapsed cord when reposition cannot be effected;
4. Version as a substitute for reposition.

Prevention of Prolapsus.—This has but a brief range of applicability. Before rupture of the membranes, in the first stage of labor, the cord may occasionally be felt, coiled in advance of the presenting part, and ready to descend as soon as rupture occurs. In such a case the membranes should be carefully preserved, and the woman placed in a posture favorable to spontaneous return of the cord to a less exposed situation. We allude to the posture about to be described, which is like-

wise of the utmost value in attempts to reposit the cord after prolapse has really taken place.

Reposition.—So long as the woman occupies a position on her side or back, the cord, from its very weight, will manifest a strong disposition to return after every reposition. The tendency can sometimes be overcome by carrying it deeply into the uterine cavity, but this may involve introduction of the hand. "We should not hesitate," says Tarnier, "to carry the hand up to the fundus of the womb for the purpose of leaving the prolapsed portion in that part of the organ." It occurred to Dr. T. Gaillard Thomas to invert the uterus, and thereby bring the force of gravity in the direction of the fundus, by placing the woman in the knee-elbow, or, better still,in the knee-



FIG. 252.—Postural treatment for prolapse of the Cord.

chest position. The anterior uterine wall is thereby made to form an inclined plane down which the cord slips. With the woman in this posture it is in some cases found that the force of gravity alone is sufficient to restore the prolapsed cord, since the head or other presenting part ceases to press firmly on the brim, and nothing suffices forcibly to maintain the displacement.

When the funis has thus been placed beyond the risk of compression, the forceps may be applied, and the head drawn into the brim, thus preventing a possible renewal of the complication. If the forceps cannot well be used at this juncture, the head may be retained at the brim by firm hypogastric pressure, and the woman permitted to resume a less irksome position. The postural treatment is suitable to all cases wherein there is

any hope of restoring the cord to the uterine cavity; but it will usually have to be supplemented by either manual or instrumental aid.

Whenever practicable, instrumental and manual reposition should be performed with the woman in the knee-chest position.

The methods of reposition vary greatly. Tarnier, as before quoted, thinks it justifiable to carry the cord with the fingers as high as the fundus uteri, while others regard even the hollow

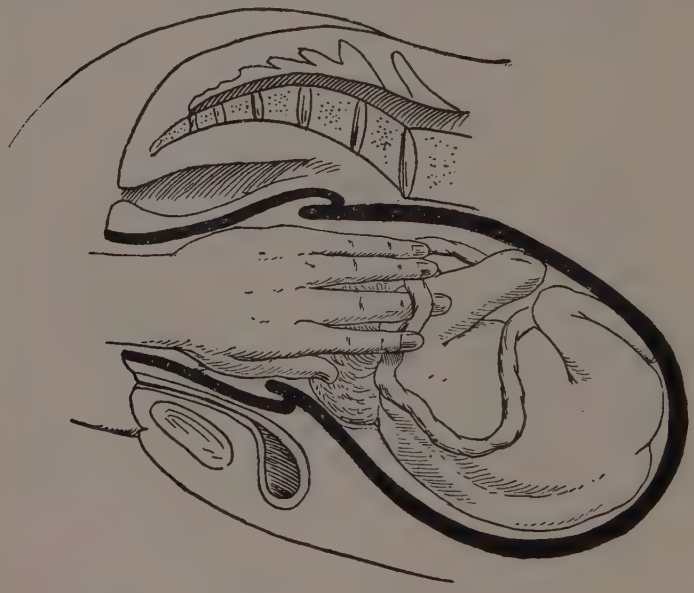


FIG. 253.—Manual reposition of the Cord. (After Auvard.) (Woman in knee-chest position.)

of the neck, in vertex presentation, as too elevated. Unfortunately, reposition, when thoroughly performed, is often extremely difficult to effect, and exceedingly disappointing in its results.

Various instruments have been devised to aid in the manœuver, but few possess them, and fewer still can successfully use them.

Among the most practical instruments for this purpose is a pair of dressing forceps with which the cord is seized, in the manner shown in the accompanying figure, and elevated to its position above the reach of compression. The forceps can then

be unlocked and withdrawn. Such an instrument requires careful manipulation to prevent injury of the maternal and fœtal structures.

The fact is, that, in most cases, relief must be afforded without the least delay, and the preparation of the ingenious means recommended in many text-books consumes the very time which determines the issue of the case. It is our opinion that in those cases wherein successful reposition is at all possible, the hand is a better instrument than any yet devised, and with it we may more safely press the cord into the uterine cavity, and maintain it there. To effectually carry out this sort of treatment, then, we should bear in mind the following points:

1. The knee-elbow, or the knee-chest, position, for the woman.

2. The use of the hand to return the cord, carrying it well into the uterine cavity.

3. The immediate application of the forceps, or supra-pubic pressure to prevent recurrence of the complication.



FIG. 254.—Reposition of the Cord with forceps. (Auvard.)

PROTECTION.—Efforts at complete reposition often fail. Moreover, in a certain number of cases the event proves that labor had advanced too far to admit of a return of the cord to a situation high enough to escape compression, and this, too, in some instances, where there is good ground for hoping to save the child's life. Treatment will then in great measure be controlled by surrounding circumstances.

Nor should we forget that prolapse of the funis does not always necessitate protracted interruption of the fœtal circulation. The cord may be in a protected situation, and if it is not, we may be able to place it there. If pulsation has not long been absent, and labor is progressing rapidly, it may be completed in a natural manner, in time to preserve the fœtus. Again, if compression has not been long-continued, and the pelvic structures are in a favorable condition, the forceps may be applied, and labor terminated without delay.

VERSION.—If the head still lies free at the brim, and all efforts at reposition of the cord have failed, we may have recourse to version. Engelmann found that seventy per cent. of the children delivered in this way were saved. Decision is here a point of great nicety, since the operation of podalic version augments the maternal dangers. Statistics have not been gathered upon which to base a rule of action in such cases, and the matter is thus left entirely to the judgment of the practitioner. If version can be effected by the Hicks method, the objections would be measurably robbed of their force; but, unfortunately, this mode of operating, at such a time, is rarely practicable. "It is scarcely necessary to state," Engelmann emphatically says, "what figures so plainly show, that version, preceded by judicious postural treatment, is the method to be followed which promises most for the life of the child, in prolapse of the cord, when complicating head presentations."

Accidental Hemorrhage.—This is a variety of uterine hemorrhage regarding which relatively little is found in the text-books, or even elsewhere in obstetrical literature; yet it is of sufficiently frequent occurrence, and involves ample difficulty and danger, to merit more than passing notice. Its character, causes and treatment ought to be familiar to the student of midwifery.

ITS CHARACTER.—What does the term "accidental hemorrhage" signify? In one sense we may justly regard every flooding as the result of accidental causes, but the designation here made is specific. The elder Rigby, more than a hundred years ago, clearly drew the lines of accidental hemorrhage, and established its distinctions. The term is employed more especially to differentiate between two varieties of hemorrhage occurring at a like period in pregnancy, and presenting similar features. Accordingly there are "accidental hemorrhage," and "unavoidable hemorrhage," both encountered in the latter months of utero-gestation, and prior to fœtal expulsion. The former often proceeds from accident, and from this fact the designation is probably derived. A profuse flow of blood occurring earlier than the seventh month does not acquire the title, it being recognized merely as a symptom of threatened abortion.

It rarely occurs among young and vigorous women.

THE RELATION OF FŒTUS AND PLACENTA TO THE UTERUS.—The placenta is in its usual situation, high up on the body of

the uterus, or at its fundus, and the vascular relations of the several parts differ in no essential particulars from those recognized as normal. There are, in general, no anomalies in the arrangement of various parts, nothing perceptibly unusual in the relations of the fœtus to the placenta, or of the placenta to the uterus, which could possibly render the loss of blood in any strict sense unavoidable.

THE CAUSES.—The immediate cause of the hemorrhage is an incomplete dissolution of the utero-placental relations, and the consequent exposure of bleeding vessels. The remote causes—that is to say, the causes proposed to account for the placental separation—are often untraceable, but albuminuria is among them. In a certain proportion of instances, the mainspring of the broken relationship is plainly referable to accidental influences. The woman has suffered an unusual muscular strain from sudden motion, from lifting a heavy weight, or perhaps a light weight at disadvantage, from a long walk, from a high reach or a high step. Within a few moments, or hours, a flow of blood sets in, and a case of accidental hemorrhage is rapidly developed. A blow upon the abdomen may fall on the site of placental attachment, and partial separation be produced. Even violent fœtal movements may sever the utero-placental relations. During the latter part of pregnancy these relations are more feeble than at an earlier period, and it is surprising that they are not oftener prematurely broken. It is quite probable that in some women the connection becomes so infirm, that any unusual motion, or even ordinary locomotion, is sufficient to sever it.

VARIETIES.—There are two varieties of accidental hemorrhage, namely, the open and the concealed, or the external and the internal. In both, the flow is occasioned by partial separation of the placenta, and in both, blood is poured out between the fœtal envelopes and uterine walls. In one case it freely escapes through the os uteri, and in the other it meets an obstacle and remains pent up in the uterine cavity. The effect on the patient is much the same in either case, though concealed hemorrhage is attended with rather more danger, from the fact that its existence is not generally disclosed until extensive depletion has resulted.

SYMPTOMS OF EXTERNAL HEMORRHAGE.—The symptoms of the open variety are manifest, and generally exhibit diagnostic characters. Whether preceded or not by an injury or strain,

bleeding begins, and at first is not necessarily accompanied by any other symptom of premature labor.

If the loss of blood is but slight, it ought not to be dignified by the title of hemorrhage. During pregnancy, in nearly all stages, there is an occasional "show" of blood, which possesses no special significance.

In connection with the flow there may be pressure in the sacrum and abdomen, succeeded after a time by real recurrent pain. When profuse hemorrhage sets in during parturition, the uterine contractions usually become feeble, or entirely cease.

SYMPTOMS OF CONCEALED HEMORRHAGE.—In the concealed form, blood is discharged between the membranes and uterine walls, or beneath the placenta, causing still greater separation. The exuded fluid is sometimes confined beneath the placenta, which remains attached only at its margins. A surprising quantity of blood is sometimes thus confined, causing considerable, and even dangerous, distension. Dr. W. Goodell collected 106 cases of concealed hemorrhage, and, from a study of their symptoms, deduced the following marked signs: 1. An alarming state of collapse evinced by coldness of the surface, excessive pallor, feeble pulse, yawns, sighs, dyspnœa, restlessness, retching, etc. 2. Generally, severe pain in the abdomen. 3. Marked distension of the uterus. 4. When occurring during labor, an absence or a feebleness of uterine contractions. In addition to these symptoms, there may be dimness of vision and syncope. Observing such signs, the hand is placed upon the abdomen, and remarkable distension is found. Pressure may force away the obstacle from the cervix, or separate the membranes or placenta wherein the flow is pocketed, and allow the pent-up blood to escape with a sickening gurgle.

Madame Boivin had little faith in the possibility of fatal concealed accidental hemorrhage. "I cannot believe," she says, "that the uterus, filled with the product of conception, can, at any stage of gestation, admit so considerable a volume of blood, unless it has been recently emptied, nor can the quantity be sufficient to occasion the death of the woman." Velpeau entertained a similar opinion. Dr. Meigs "never met with a sample of this kind of bleeding." But facts are always more forcible than theories; and the evidence of fatal cases put upon record is a sufficient response.

DIFFERENTIAL DIAGNOSIS.—Little difficulty is generally experienced in differentiating between accidental and unavoidable

hemorrhage, but in order to make the distinctions explicit beyond a doubt, the following comparison has been arranged:

ACCIDENTAL HEMORRHAGE.	UNAVOIDABLE HEMORRHAGE.
1. Often preceded by a blow, strain, or other injury.	1. Rarely preceded by an injury.
2. Most frequently sets in moderately and, for a time, gradually increases.	2. Generally comes suddenly and profusely, but often lasts only a short time.
3. There is no history of previous hemorrhages of recent occurrence.	3. Hemorrhages, brief, but free, in a goodly number of instances, occur at intervals after the fifth or sixth month.
4. If uterine contractions are present, the flow is more marked in the intervals.	4. The flow is more profuse during a contraction.
5. The cervix uteri and neighboring uterine walls appear to be of normal thickness and feel.	5. The cervix and uterine walls, as felt through the vagina, are generally thick and doughy.
6. If the os uteri will admit the finger, the membranes may be felt, and through them, as a rule, the presenting fœtal parts.	6. If the finger is passed through the cervical canal it generally comes in contact with some part of the placenta, which constitutes the presenting part.

PROGNOSIS.—This is usually as bad as in connection with unavoidable hemorrhage. Guy's hospital reports show a maternal loss of about 26 per cent. and a fœtal mortality of 66. Goodell's researches disclosed a maternal mortality of 51 per cent. and a fœtal mortality of 94 per cent.

TREATMENT.—Rest in a recumbent posture, perfect quiet and freedom from excitement and irritation, must be enforced. The discreet use of cold may be sufficient to arrest the flow, or greatly modify it. The patient must be carefully guarded against disappearance of the external hemorrhage, and the occurrence of a concealed discharge.

If the placenta has separated over only a small area, this treatment alone may be adequate; but if a considerable surface of so great vascularity has been exposed, more radical measures will be called for. It is manifestly desirable in accidental hemorrhage developed prior to the middle of the ninth month, to overcome the threatening symptoms, and, if possible, prevent premature labor.

The first question to be answered here, as in threatened abortion, is,—"Is expulsion inevitable?" and if there is any likelihood of preventive measures succeeding, endeavors should

be directed towards arrest of the symptoms, by such means as will not tend to promote the expulsive process. These are few and simple, and have, in the main, been indicated. Medicines can hardly be expected to have any direct control over the flow. Bleeding vessels are exposed, and, with the womb still distended by the product of conception, they cannot be constringed as they usually are under other conditions.

The flow can be arrested, under the circumstances, only by the formation of coagula which will seal the vessels. Drugs cannot be expected to do that; but there is an indirect service which they can render, and that is to soothe the nervous and vascular excitement. To accomplish this, the law of similars is our best guide, though the use of morphia for the purpose is not to be condemned. The nervous tension may be subdued by *coffea, stramonium, actæa,* or *ignatia,* and the vascular excitement by *aconite, veratrum viride,* or *belladonna.*

It should be remembered, also, that among the best sedatives at such a time are encouraging words from the medical attendant, and the exhibition of perfect self-possession. Should he evince agitation or alarm, his patient, however placid before, will become inoculated with the prejudicial ferment, and be made less responsive to curative influences.

Pressure on the fundus uteri will sometimes modify, or wholly arrest, the loss. In applying it, much force must be avoided through fear that all hope of preventing premature labor may thereby be destroyed.

If fœtal expulsion is clearly inevitable, the measures described being inadequate to overcome the flow, or if the loss is at all alarming, every effort should be directed towards emptying the uterus. In the conduct of a case up to the time when preventive measures cease to be indicated, care is exercised to preserve the membranes intact; but now as an approved, and, in most instances, effective, mode of treatment, they are punctured or torn, and the liquor amnii drawn off. To do no more than merely rupture the membranes may be insufficient, and hence, after providing an opening for escape of the amniotic fluid, it is better, between pains, to crowd the presenting part away from the brim to permit complete escape of the fluid. By such an operation the uterus is enabled to diminish its bulk, and by joint effect of condensation and compression it is often enabled to terminate the hemorrhage. "The puncture of the membranes," says Dr. Barnes, "is the first thing to be done in all cases of

flooding sufficient to cause anxiety before labor. It is the most generally efficacious remedy, and it can always be applied."

Occasionally the uterus is sluggish, and rupture of the membranes is not followed by the favorable effect so earnestly sought. In that case it must be aroused to action by kneading, by cold applications, by indicated homeopathic remedies, or even by ergot, provided the other conditions are favorable. The tampon ought not to be used in such cases unless it be inexorably demanded, and, if used at all, concealed hemorrhage must be sedulously guarded against. An expedient far preferable to tamponing, is pressure of the presenting part into the pelvic brim by means of the hands on the abdomen.

Delivery by the forceps, or podalic version, should be effected at the earliest practicable moment. If necessary, gentle manual dilatation of the os uteri may be practiced, until the hand can be introduced, or the instruments applied. The forceps are to be preferred in case the vertex constitute the presenting part. When once applied and traction begun, the special emergency has passed, and the very presence in utero of the blades will be likely to awaken the uterus to renewed activity, while at the same time the head is being steadily drawn into and through the pelvic cavity. If the forceps be not at hand, or cannot be speedily obtained, or if the presentation be face or transverse, then podalic version ought at once to be performed. The Braxton Hicks method may here be employed before the os has attained a size which will admit of forceps delivery, and much valuable time thereby saved.

If, after rupture of the membranes, the hemorrhage be not arrested, and yet the os be found too small for operative procedure, one of Barnes' bags may be introduced to hasten dilatation, while the uterus is carefully watched to see if there develop evidences of internal hemorrhage.

When the breech presents we may depart from the common course of treatment by bringing down a foot and drawing the fœtal thighs into the pelvic cavity. This will enable the uterus to contract to such an extent as to control the hemorrhage, and then we can safely commit the case to the natural efforts. If, however, we have good reason to distrust this hemostatic action of the uterus, delivery should be terminated without unnecessary delay.

CHAPTER XV.

OTHER PARTURIENT ANOMALIES ARISING IN THE FIRST AND SECOND STAGES OF LABOR.

Rupture of the Uterus.—This most dangerous accident of labor is fortunately a comparatively rare occurrence. Burns calculates that it happens once in 940 labors. Ingleby, once in 1,300 or 1,400; Churchill, once in 1,331; Lehmann, once in 2,433; Jolly, once in 3,403; Ames, once in 4,883; and Harris, once in 4,000. It need not be said that, in these calculations, ruptures of the intra-vaginal portion of the cervix uteri, which are exceedingly common, are not included. In their immediate effects, the latter are rarely of much moment, though their baneful influence on the health of women has been clearly demonstrated.

SEAT AND CHARACTER OF LACERATIONS.—Rupture of the uterus takes place much less frequently in its upper part, but the site of placental insertion is rarely involved. The most common point of rupture is near the junction of the body and neck, either anteriorly or posteriorly. Laceration nearly always begins in the lower segment. In a few cases the cervix has been torn away from the body of the organ in the form of a ring.

The laceration does not invariably penetrate all the structures which go to make up the uterine wall. The peritoneum may wholly escape in one instance, while again it may be the only part involved. The tears vary also in length. Beginning as they usually do in the lower segment, they rarely extend high along the body of the organ, and more rarely still into the fundus, though they often extend downwards through the cervix, and may even implicate the vagina.

The direction of laceration varies greatly, but it is usually either transverse or oblique.

TIME OF RUPTURE.—This distressing accident is not confined to labor, but it has many times been known to occur during pregnancy. The early part of gestation is almost wholly exempt from it by reason of a lack of great distension and attenuation of the uterine walls.

During labor the accident rarely happens early.

ETIOLOGY.—During pregnancy the causes are a yielding

cicatrix left after a Cæsarean section, the thin wall of the rudimentary horn of a double uterus, direct violence, or an unusual muscular effort.

Among the predisposing causes of the accident during labor we may mention abnormal thinness of the uterine walls, morbid conditions of the muscular fibers, such as accompany malignant and fibrous growths, fatty degeneration and the results of injuries. Dr. Trask, who collected 417 cases, alluding to sixty-seven of them wherein the causes were assigned, says: "Of this number there were thirteen healthy, twenty softened, twenty-one thinned, one thinned and softened, three at some points thinned and at others thickened, eight diseased, one thinned and brittle." Multiparity appears to have a decided influence in the production of the accident. Charpentier says that multiparous uteri develop thinness and are reduced in power; but we believe that multiparous uteri are relatively more powerful, and that it is the very strength of their contractions which occasion the accident.

Among the exciting causes of the accident, vehement action of the uterus occupies the most prominent place. Irregularity of the pelvic brim, unusual prominence of the sacral promontory, and osseous spiculæ or more obtuse projections at any point on the inner surface of the pelvis, are disposed to lacerate or grind the uterus as the fœtus is driven onwards through the pelvic canal.

Lusk epitomizes Bandl's teaching on this subject substantially as follows: In normal labor, during each pain the fundus and corpus uteri thicken, while the lower part is stretched and thinned by the ovum or presenting part of the fœtus. So long as no obstacle is met which hinders descent, the process ends in conversion of the uterus and vagina into one continuous canal. The lower circumference of the body is ordinarily distinguished in advanced labor from the stretched lower segment by a thickened ridge known as the "ring of Bandl," though in easy labors this feature is indistinctly marked. When descent is hindered, the resistance of the ligaments which hold the uterus in position is overcome by the continued retraction of the body and fundus, until, in extreme cases, the fœtus may finally be almost wholly embraced within the thinned walls of the lower uterine segment. Under these circumstances the contraction ring of Bandl becomes very distinct, and may sometimes be felt nearly as high as the umbilicus. This movement is somewhat limited

by the uterine ligaments, and since they are more relaxed in multiparæ than in primiparæ, it is not difficult to understand the relative frequency of rupture in women who have borne children. In exaggerated examples of this action, the walls of the lower uterine segment may be reduced to membranous thinness.

Jolly collected thirty-three cases of uterine rupture resulting from undue force of uterine action excited by the injudicious use of ergot.

Mechanical injuries are responsible for a good many of these accidents. The organ has been ruptured by falls and blows received in the latter part of gestation; also from violence in the performance of certain operations, such as version and use of the forceps.

SYMPTOMS.—In some instances uterine rupture has been preceded by certain premonitory symptoms, such as unusually agonizing pain, accompanied by a sense of cramping in the hypogastric region, but, in the very nature of the case, such symptoms are of but little value as indications of what is about to follow, since they cannot be separated from the ordinary pains of a difficult labor uncomplicated by an impending accident of so fatal a nature.

The severity of the symptoms necessarily depends in great measure on the extent of the rupture. Numerous cases have been reported in which post-mortem or other evidence of uterine laceration has been found, though the women during labor presented none of the alarming symptoms which commonly accompany the occurrence. But there is usually a sudden sharp and excruciating pain, quite unlike the pains of labor, followed by well-marked indications of a serious accident. Then there is a recession of the head or other presenting part, when it is not tightly held at the brim, or lying in the pelvic cavity, and a sudden cessation of the recurrent contractions. If the laceration be extensive, the child commonly passes through it into the abdominal cavity, where its outline is easily distinguishable through the abdominal walls. A coil of intestine may prolapse through the laceration and descend into the vagina. The symptoms of collapse at once supervene, blood gushes from the vagina, and the sounds of the fœtal heart cease.

The real character of the occurrence is in some cases masked by the maintenance of strength, the presence of the presenting

part at the brim, and the continuance of fair pains. Fatal symptoms may not develop until after the lapse of some hours, or even days.

Following are the results of Jolly's study of 580 cases with respect to the symptoms manifested after rupture:

Abrupt cessation of uterine contractions observed in	218	cases.
Gradual " " " "	38	"
Change in the pulse observed in	179	"
Prostration observed in	151	"
External hemorrhage observed in	148	"
Retrocession of presenting part observed in	146	"
Abdominal pain observed in	133	"
Alteration of countenance observed in	115	"
Fœtal parts felt immediately under abdominal wall in	77	"
Acute pain at the moment of rupture observed in	62	"

PROGNOSIS.—The great majority of cases end fatally, but Dr. J. M. Rose has reported a case wherein uterine rupture took place in four successive labors. Death may occur from shock or hemorrhage a few minutes after the accident, or may be postponed for days, or even weeks, and ultimately result from peritonitis, septicæmia or pyæmia. A loop of intestine may be strangulated in the fissure, or be injured in reposition. As will be seen in the proper place, laparotomy has saved many lives.

The statistics collected by Jolly show a maternal mortality of about 82 per cent. and a fœtal loss of 92 per cent. Auvard thinks that, under antiseptic precautions and skillful surgical management, the maternal loss should not exceed 50 per cent.

TREATMENT.—An important part of the treatment is of a preventive kind, but this has been sufficiently considered in connection with the treatment of the conditions which predispose to the accident.

Treatment of these desperate cases is logically and clearly set forth in the following manner by Dr. Charles A. L. Reed, in a recent contribution to *The New York Medical Journal:*

"Most cases of rupture of the uterus occur in vertex presentations, and the first objective evidence of the occurrence of the accident is recedence of the head. Contraction of the longitudinal fibers is the next phenomenon, and the head, following the direction of least resistance, is forced into the rent. In some cases, however, instead of contraction of the longitudinal fibers, inertia supervenes, and labor, for the time, comes to a standstill. If, happily, the rent be now incomplete, the timely inertia

arrests the extrusion of the head and saves the peritoneal cavity from invasion. It is precisely this latter contingency which should dictate the treatment: Apply the forceps and deliver at once.

"The usual alternative of the treatment is turning, as advised by Leishman. It is against this alternative that I desire to enter my protest. It should be remembered that at this juncture, as a rule, the differential diagnosis between complete and incomplete rupture cannot easily be made. In this case we should always act upon the presumption that the rupture is incomplete; and our practice should be adopted with reference to saving the peritoneum. In some cases, turning figures as one of the primary causes of rupture. Ought we, therefore, in a case in which at least partial rupture has already weakened the uterine wall, to adopt a manœuver which has been known to produce rupture of the uninjured wall? Clearly the proposition is as irrational as the practice is disastrous.

"But there are instances in which delivery by the forceps *per vias naturales* is impracticable—e. g., cicatricial bands at the internal os, and extreme kyphosis. What should be done under such circumstances? I contend that all efforts at delivery by any expedient whatever should be at once abandoned. The attempt at applying the forceps should not be made if pelvic contraction or other insurmountable obstacle to delivery is manifest; and if a single application of the forceps demonstrates the impracticability of delivery by that method, the verdict should be accepted at once. Repeated efforts at applying the forceps should be avoided, as each effort will do more or less damage to an already damaged uterus, and may thus interfere with the resolution of that organ. Turning should not be thought of. At this juncture either craniotomy or embryotomy has been practiced. The ascertained mortality of the procedure but confirms the condemnation which a rational contemplation of it furnishes. What, then, should be done? I advise that the patient be at once submitted to abdominal section, and delivery effected either by incision of the uterus, if the rupture is incomplete; or through the (if necessary) enlarged rent, if the rupture is complete; and that the uterus be then treated according to either Sänger's or Porro's method.

"What shall be done in cases of rupture of the uterus in which the child and after-birth have been successfully extracted by the natural passage?

"The first thing that ought to be done after successful delivery by the natural passage should be to determine, by cautious and gentle manipulation, whether or not the case is one of complete or incomplete rupture. If found to be incomplete, the case should be treated by antiseptic irrigations. I do not employ chemical antisepsis in aseptic surgery, but in this case we have to deal with an open and absorbent surface, and, very shortly, with the products of putrefaction in contact with that surface; hence it becomes eminently proper to employ either a phenolic or a mercuric-bichloride solution.

"But in the event that the tear is found to communicate with the peritoneal cavity, we are at once brought face to face with one of the moot questions connected with the subject. It is just here where Parvin asserts that abdominal section would not be justifiable unless 'there has been hemorrhage or escape of amniotic fluid into the peritoneal cavity;' and it is precisely in these cases that Lusk tells us that 'recovery *quoad vitam* has been obtained by employment of antiseptic irrigation,' etc., but warns us that this plan of treatment is 'only effective where no infection of the abdominal cavity has taken place at the time of rupture.' How are we to know whether 'there has been hemorrhage or escape of amniotic fluid into the peritoneal cavity'? By what process can we determine whether or not 'infection of the abdominal cavity has taken place at the time of rupture'? Clearly, the only rational recourse at our hand is exploratory incision, and I may go a step further and say that exploratory incision, in the ordinary acceptation of the term, falls far short of the requirements of the case. Those of us who are familiar with making the toilet of the peritoneum after a bloody ovariotomy know with what facility even large clots may elude finest tactile sensibility. It is manifest that in cases such as that under discussion nothing short of copious flushing can at once establish the diagnosis of intraperitoneal extravasation, and rid the cavity of the offending stuff.

"But it is not alone to remove existing infection of the peritoneal cavity that abdominal section should be done in these cases, but it is to close the rent, and thus prevent, if possible, the migration of the germs of putrefaction from the cavity of the uterus into that of the peritoneum. It is true that this cannot be done in all cases, tears low down in the posterior wall being beyond the range of operation; but, when it can be

done, the edges of the wound should be carefully trimmed, approximated, and securely closed by the Czerny-Lembert suture.

"What shall be done in cases in which the child has been born, but in which the placenta has escaped into the peritoneal cavity?

"This complication occurs with relative frequency, and when it does occur it is the next in order of events to claim attention. In this class of cases we have a condition in which it would seem that removal of the placenta could be readily effected through the rent; but that it is, on the contrary, a very difficult manœuver, is shown in a case which, when I was called to it, presented exactly the problem indicated in the question at the head of this paragraph.

"What shall be done in cases in which the child, or the placenta, or both, have escaped into the peritoneal cavity?

"It would seem that the duty of the practitioner is clear under these circumstances. Yet, when he turns to our authors, he finds himself led in both directions at once. He finds himself taught that abdominal section should be done in cases of evident contamination of the abdominal cavity; he is told that the operation should not be done in all cases in which 'the fœtus can be readily delivered through the natural passage;' and he is reminded of recoveries from antiseptic irrigations and antiseptic gauze packs; and then he wonders whether, indeed, it be possible to gain direction out of indirection. He is left entirely on his own responsibility, and to solve the problem strictly on its merits.

"The first fact to claim attention is that the uterus, in the act of rupturing, must have discharged some blood into the peritoneal cavity; and the next is, that the child and placenta must have carried with them more or less of detritus. Amniotic fluid may have found its way into the abdomen. These considerations alone should prompt abdominal section—if not for the purposes of delivery, yet for the purposes of cleanliness. If the abdomen is to be opened for the purpose of flushing, why not effect delivery through the incision at the same time? There are other considerations prompting to this course. The advice of Parvin, that abdominal section should not be done when the fœtus can 'be readily delivered through the natural passage,' is liable to a dangerous interpretation at the hands of practitioners who are anxious to evade the responsibilities of the knife. With them 'ready delivery' is liable to imply not

merely the introduction of the hand, which is not devoid of danger; nor the mere grasping of the presenting part, which is not always easy; nor the mere turning in the abdominal cavity, which is always hazardous; but a test of the tractile power of the operator and the resistant power of the patient. In this way patients may be subjected to a hazard which the knife in the hands of a skilled operator could not incur.

"But we are 'informed' that good results have been had in some cases by 'washing out the peritoneal cavity through the rent with an antiseptic fluid and securing drainage;' and, again, we are told of recoveries by 'employment of antiseptic irrigation and filling the gap with antiseptic gauze.' I will not dispute the fact of such recoveries, for they are well authenticated, but I cannot but concur with Harris that every such recovery is to be looked upon as a misfortune, tending, as it does, to stimulate others to persist in a practice that is essentially unscientific.

"The only danger to life, however, does not come from extra-peritoneal infection, which may have found its way into the cavity at the time of rupture, or that may have been carried thither by the child, or the placenta, or both, nor yet that may have subsequently traversed the wound in the form of lochia. It must be remembered that the parenchyma of the uterus has sustained serious damage (1) by its own violent contractions, (2) by the rupture, (3) may be by the use of the forceps, (4) by the escape of the child through the tear, (5) by repeated digital examinations, (6) by the introduction of the hand, (7) by efforts at traction to determine the feasibility of delivery *per vias naturales,* and (8) by the forcible withdrawal of the child through the rent. All these influences may have been brought to bear upon a uterus before the surgeon is called. What prospect has such a damaged uterus for resolution? Is it not much more liable to become the breeding-ground of septic germs that may have originated in the first instance at the placental site? And, if we thus have established a suppurative parenchymatous metritis, is not the death of the patient from septicæmia almost a foregone conclusion? In the light of these considerations extirpation of the uterus is clearly indicated, and should be recognized as a definite probability in undertaking abdominal section in these cases.

"My conclusions are:

"First. In cases of rupture of the uterus, with the head pre-

senting, delivery by forceps should be attempted, but should be abandoned if not found easily practicable. Turning should not be undertaken, but the case should be at once recognized as one for either the Cæsarean or Porro operation.

"Second. In cases of ascertained incomplete rupture, treatment should be by antiseptic irrigations and rest.

"Third. All cases of ascertained complete rupture should be submitted to abdominal section so soon as the condition of the patient with reference to shock will admit, for the following purposes—namely, (1) to explore the abdomen, (2) to remove all foreign bodies, (3) to cleánse the peritoneum, (4) to close the rent if the labor has been short and the uterus not seriously damaged, and (5) to remove the uterus if the labor has been long and the uterus seriously damaged."

The after-treatment of women who have suffered uterine laceration, followed by laparotomy, differs in no important respects from that bestowed upon laparotomy cases in general.

Schaeffer, who has given much study to the subject, says that laparotomy is most successful in those cases wherein the fœtus has escaped with intact membranes into the peritoneal cavity through the scar of an old Cæsarean section or after a brief labor. When the fœtus, with either ruptured or unruptured membranes, escapes through a uterine scar during labor, the result is favorable in 60 to 77 per cent. of all cases. When the fœtus escapes, under similar circumstances, during pregnancy, and suppuration results, 60 per cent. recover. When rupture of the uterus and complete escape of the fœtus into the peritoneal cavity, along with the liquor amnii, take place during labor, laparotomy is successful in 44 per cent. of all cases, provided no other operation has been previously attempted. In those cases where other measures have been tried, and when the vesico-uterine pouch has been opened, but 25 per cent. recover. When the abdominal viscera protrude through the uterine wound, thirty per cent. are saved by operation. Rupture through the vaginal fornices is peculiarly fatal, only one case having recovered.

LACERATION OF THE CERVIX UTERI.—One need but make a careful speculum examination of the cervix uteri after labor in a consecutive number of cases to become convinced of the great frequency of traumatism in this part. The degree of it varies greatly, and what appears to be a laceration of considerable size when viewed immediately after labor, may be almost oblit-

erated by the time that involution becomes complete. Such injuries are relatively more frequent in those instances where the labor is instrumentally terminated.

LACERATIONS OF THE VAGINA.—Lacerations of the vagina occur quite frequently. Indeed, slight ruptures are very common accidents, but, as a rule, they give rise to no serious symptoms, and hence escape attention. Severe injuries of the sort usually come in connection with instrumental delivery. If the rupture is deep enough to include the entire thickness of the septum, anteriorly or posteriorly, the passage of urine or fæces is likely to prevent repair, and thus a *vesico-vaginal* or *recto-vaginal* fistula may result.

But fistulæ more frequently proceed from long-continued compression of the pelvic tissues by delay of the fœtal head in the pelvic cavity. In such cases the soft structures become devitalized, and, as a consequence, a slough comes away within the first few days succeeding delivery, followed by the evidences of fistula.

Treatment.—Lacerations of the vagina ought at once to be repaired in the manner described in chapter 3, Part III. The results of these operations are almost uniformly successful.

Rents involving both cervix and vagina cannot be so easily managed, and should usually be treated on the expectant plan.

In suturing lacerations extending entirely through the septum anteriorly or posteriorly the needle should not penetrate the mucous surfaces of the organs thus opened.

CHAPTER XVI.

PARTURIENT ANOMALIES ARISING IN THE THIRD STAGE OF LABOR.

Post-partum Hemorrhage.—Floodings after delivery present a variety of symptoms, and, hence, may be divided, according to their manifestations, into several classes. Thus we have:

1. External hemorrhage.
2. Concealed, or internal, hemorrhage.
3. Primary hemorrhage.
4. Secondary hemorrhage.
5. Hemorrhage of various degrees, namely, first degree, second degree, third degree.

1. When the flow meets with no restraint, but passes the vulva, sometimes in sparing quantities, again in alarming gushes, it constitutes external hemorrhage.

2. When, owing to some obstacle encountered at the cervix, the blood which flows from the uterine vessels is held in utero, we term it concealed hemorrhage.

In the same category may also be included that form of bleeding which escapes the attention of those under whose care the woman has been placed, until a considerable pool has formed in the center of the bed. Such flooding is sometimes, but should never be, unrecognized, even though it be out of immediate view.

3. When bleeding in any considerable quantity occurs within the first two or three hours after labor, it is regarded as primary.

4. When postponed until a later period, it is properly secondary.

5. Hemorrhage of the first degree is that wherein but little blood is lost, though for a moment it may flow in a stream. This occurs in perhaps 10 per cent. of all labors.

Hemorrhage of the second degree is that which comes in profuse gushes, and does not yield at once to abdominal pressure, but requires other measures for its arrest, and even afterwards manifests a disposition to return.

Hemorrhage of the third degree includes dangerous bleedings, wherein the loss is excessive, and the prostration profound.

THE CAUSES of post-partum hemorrhage are various, and,

inasmuch as they constitute an indispensable basis for intelligent treatment, they require thorough study.

Among the *indirect* or *predisposing* causes we may mention *precipitate labor*. It is not altogether clear why a uterus which has expended but a part of its nervous energy in expulsive effort should become atonic, and bleed profusely, as soon as labor is brought to a close, and yet clinical experience teaches that it often does. Very likely the effect is produced by temporary exhaustion, arising from the intensity of the labor while it lasts, muscular inertia following here as it does elsewhere, upon the heels of violent exertion. Contractions may be remarkably powerful, and the vital force escape exhaustion provided the action is not too long-continued. In rapid labor there is often scarcely any intermission between the pains, and occasionally but slight remission, as the result of which exhaustion may overtake the uterus before parturition has lasted two hours.

Following unduly-prolonged labor we sometimes get a similar condition. Contractions having been forcible, but intermittent, action is well sustained for a long time; but want of relative proportion between the fœtus and the pelvis, or the existence of some mechanical obstacle, may prolong the process to so great length that inertia finally results. The uterine muscles, like those of other parts, must, after long and vehement effort, have a prolonged period of rest. Labor being completed, and the stimulus by which the uterus has been provoked to action removed, the organ falls into atony at what proves to be an unfavorable moment, and is not easily aroused to renewed activity. Labor, then, which presents either of these extremes, should be regarded as a predisposing cause of post-partum hemorrhage.

Besides the direct hemorrhage resulting from cervical laceration involving an artery, there is no doubt that a plain tear is occasionally productive of uterine relaxation and consequent hemorrhage; but this action is probably not so pronounced with respect to the primary, as to the secondary, form of post-partum bleeding. It was long ago shown by Emmet and others, that proper involution of the uterus after labor is embarrassed or prevented by cervical fissure. The uterine cavity being accordingly more capacious than normal, exciting causes combine to bring about congestion of the organ and consequent blood-loss.

Flaccidity of the uterus after labor, and the bleeding resulting from it, are, doubtless, often the consequence of slovenly practices,—a neglect of those details which should be matters of routine in every case. Delivery is suffered to take place while the bladder is distended with urine; the extended head is permitted to obstruct parturition for an indefinite time without any attempt at rectification; the practice which nearly all concur in commending for every case, namely, pressure on the fundus uteri during and after fœtal expulsion, is totally disregarded; or the placenta is prematurely extracted.

Constitutional dyscrasiæ account for a small percentage of cases. There is what has been termed the "hemorrhagic diathesis," or hemophilia, which strongly predisposes to flooding. This is generally understood to depend on an abnormal condition of the circulating fluid, which favors its escape from the blood-vessels, whether ruptured or not. There is a condition closely allied to this, wherein post-partum bleeding depends, not so much on an abnormal state of the blood itself, as upon constitutional predisposition to lax muscular tone. Such women have been termed "bleeders," inasmuch as, though sometimes apparently well nourished and vigorous, they suffer from floodings in repeated confinements to the extent of producing syncope and profound exhaustion.

Repeated child-bearing predisposes to the accident. It rarely occurs after first labors.

The *proximate* causes are first, and most frequently, *uterine atony, flaccidity, inertia.*

In general, we find after expulsion of the fœtus and placenta, the uterus contracting into a globular-shaped mass which is felt in the hypogastrium, and which, from its firmness and form, has been termed the *cannon-ball contraction.* Such firm condensation compresses the large blood-vessels of the organ, thereby effectually preventing loss, and rapidly hastening permanent involution. It is clear that this favorable state is brought about by the muscular tone which the organ still maintains, despite the severe strain to which it has been subjected. When, from any cause, this firm condensation of the blood-loaded organ fails to take place, the gaping vessels, at the site of placental attachment, encounter nothing to restrain a free escape of the warm life-fluid which they contain.

Probably 98 per cent. of all cases of post-partum hemorrhage owe their immediate origin to this condition of the

uterus, and hence it ought never to be out of mind in the conduct of labor.

There sometimes exist obstacles to proper contraction of the womb after it is delivered of the product of conception. A large accumulation of urine may interfere materially, not only by direct encroachment upon the space afforded the pelvic organs, but also by sympathetic effect. Attention to the bladder during and after labor is a matter which young practitioners, before they have acquired routine habits, are extremely prone to neglect.

Tumors, generally fibroid, may thicken the walls or encroach on the cavity of the uterus, thereby preventing a complete, safe and equable condensation of the organ, and, by this condition, exposing the woman to serious depletion.

In certain instances there is hemorrhage escaping the vulva, not very profusely at any time, but continuously, though the uterus be firmly contracted. Failing to subdue it by ordinary means, we learn from a careful examination that it proceeds from a laceration of tissue involving a blood-vessel. The circular artery of the cervix is sometimes ruptured during passage of the fœtus, giving rise to a moderately free sanguineous flow.

The vestibule, which suffers a solution of continuity oftener than is generally supposed, occasionally bleeds profusely from its lacerated surfaces.

PREMONITORY SYMPTOMS.—Post-partum hemorrhage sometimes gives notice of its approach, but the signs are so ambiguous that little importance can be attached to them. Short, sharp pains, followed by complete uterine relaxation, are said often to presage the ill occurrence.

Some light is shed on the probabilities by a study of the woman's history, and by observation of her bodily habit. If she gives an account of previous bleedings, whether post-partum or other; of habitually profuse menstruation; and, finally, if the tissues of the body evidently lack healthy tone, we have reason to fear hemorrhage.

A rapid pulse is commonly regarded as a highly suspicious symptom, and, so long as it continues, the woman is thought to be in imminent danger of the accident which we are now studying. Dr. J. Ashburton Thompson has made extensive and minute observations, and as a result thereof has been led to believe that "these notes justify a contradiction of the bare

assertion that a pulse which beats at or about a hundred shortly after labor prognosticates inertia of the uterus. * * * These notes show that in fact I have disregarded the pulse-rate as a prognostic, or indication, of my patient's safety from hemorrhage." Dr. M. M. Bradley found in 300 cases that the pulse was from 50 to 130. "From these observations," he says, "I am not inclined to attach much importance to the pulse-rate, either as a sign of danger, or of post-partum hemorrhage."

The degree of blood-pressure has some influence to produce and maintain hemorrhage from the uterus after labor, and it is a physiological fact that with high arterial tension we most frequently have a pulse of but moderate rapidity.

GENERAL SYMPTOMS.—Hemorrhage usually sets in soon after expulsion or extraction of the placenta, and nearly always within the forty-five minutes immediately succeeding. Occasionally it begins when yet the secundines remain undelivered, while the attendant is giving the child necessary attention.

If the hand rests upon the fundus uteri, as it ought in every case at this stage of delivery, contraction, which at first may have been good, is observed to relax, and the womb, which was easily felt while in a condensed form, now escapes, so that its outline cannot be clearly defined.

Bleeding generally begins suddenly, and often ceases in the same manner. There may be but a single gush, or one spurt may succeed another, and rapidly reduce the woman. Sometimes the flow is comparatively passive, but exceedingly persistent, so that in half an hour there is great depletion. In bad cases the blood runs in a torrent, and rapidly drains the system.

In concealed hemorrhage, though the womb, after delivery, is at first firmly contracted, it soon becomes flaccid; an impediment, frequently in the form of a coagulum, obstructs the flow; the uterus offers but feeble resistance, and bleeding goes on within. In case the hand is kept properly applied to the abdomen, and a clear uterine outline insisted upon, there is little likelihood of dangerous blood-loss. Bad examples of hemorrhage are met in those cases wherein abdominal pressure is neglected, or the bleeding begins a considerable time after labor, when watchful care has ceased. There being no outward indication of the flow, its occurrence is not often recognized until the effects of depletion are manifested in the countenance and feelings of the woman. She will complain

of great exhaustion, and may fall into a state of syncope. Alarmed at her condition, the physician feels her wrist only to find the pulse feeble and fluttering, or finds it not at all. The hand on the abdomen obtains clear evidence of a distended uterus, and firm pressure causes the coagula to gurgle forth into the bed.

There is a spurious form of concealed hemorrhage that is manifested as a result of professional ignorance or inattention. The ordinary precautions are disregarded—the fundus uteri is left uncovered by the hand, none of the signs of bleeding are watched for, and the accident is far advanced before the guilty attendant is aware of its existence. Blood pours forth noiselessly, while the patient, reposing the utmost confidence in the skill of her physician, rests quietly, until she feels a deathly sensation stealing over her and is impelled to call for help. On throwing up the bed-clothes there is found, to the consternation and shame of her dull attendant, a great pool of blood.

The symptoms of post-partum hemorrhage differ mainly in intensity. There may be but a brief flow, producing no special effect on the woman. This is the sort which the young practitioner so often meets, and which responds readily to a dose of *ipecac* or *belladonna,* given in a routine way. In other instances, happily infrequent, the flow begins like the other, is a little more free, and is indisposed to surrender to the remedies mentioned, or to any other drug, but ultimately ceases, either from natural causes, or manual treatment combined with refrigeration. In a third class of cases, the flow comes suddenly, and spurts from the vulva like water from a pump, waits for nobody, is unmindful of drugs, yields to neither cold nor heat, and, in the absence of proper treatment, hurries the patient down through the various stages of loss. The extremities become cold and damp; the countenance gets pale and ghastly; the pulse rapid and small—perhaps intermittent; the limbs weary but restless. There is sighing respiration, dimness of vision, and syncope. Later the whole body, and even the breath, grows cool; intense restlessness and jactitation supervene; and death ends the scene.

SECONDARY HEMORRHAGE, after labor at full term, is generally consecutive upon other symptoms which indicate a retention in utero of a fragment of the secundines, or a coagulum; the existence of interrupted involution, or of malposition of the organ.

When the placenta is delivered in any case of labor, it ought to be carefully inspected to make sure that no part is left behind. If much traction force is applied to the cord, the bulk of the organ and membranes may be brought away, while a portion, large or small, is left behind. Disintegration of such a fragment usually takes place, and the detritus passes off in the lochia, without disturbance; but in other cases, hemorrhage results.

There is developed in rare instances a supplementary placenta, *placenta succenturia*. The connection between the organs being marginal, the smaller, or secondary one, may be left behind. Any examination but the most minute would scarcely be sufficient to disclose the fact, and it comes to light only when hemorrhage, or septic symptoms, with offensive discharges, lead to uterine exploration.

In few cases of secondary hemorrhage do we find the flow extremely profuse. It is alarming on account of the period when it occurs, the time for flooding presumably being past. Still, the patient occasionally evinces signs of great depletion, and may threaten collapse.

During the first few days after delivery, even in normal cases, the woman is in a state favorable to the development of a variety of ills, and, among them, sudden and profuse blood-loss. A powerful disturbance of the emotional nature exhibited in great joy, anger, or fear, is capable of giving rise to serious, even fatal, hemorrhage. Instances of the kind have been placed on record, which stand as serious reminders of possible occurrences.

PROGNOSIS.—The remote effects of excessive loss, some of which have been mentioned in another chapter, should not be forgotten. A train of ills is liable to follow, and make miserable an otherwise happy life. The immediate prognosis in most cases is favorable. The great majority of women do well after flooding, and some authorities have accordingly taught that it is more alarming than dangerous. There are always entailed a few days of suffering from headache, prostration, and, may be, vomiting and purging. Then follow convalescence, and, in favorable cases, perfect restoration. But the exceptions occasionally observed, in respect to both immediate and remote effects, should give to the favorable prognosis an air of seriousness.

Women who have suffered a considerable loss of vital fluid

are much more liable to septic infection. The system seems ready to drink in whatever is offered, whether nocuous or innocuous, as does an empty sponge. In such cases, there is the greater need of thorough cleanliness in the management of the case.

TREATMENT.—*Preventive treatment* is of the utmost consequence, and yet it consists in the adoption of but few special rules. The directions given for the conduct of normal labor are generally sufficient of themselves, when scrupulously observed, to prevent the occurrence of untoward symptoms after delivery. If we make it a rule of practice attentively to observe the progress of the head through the pelvic cavity, and see that it follows those positions and movements which are favorable to ready performance of the mechanism of labor, which in their turn preserve the uterus from undue exertion; if we keep the bladder empty; if, upon expulsion of the child, we apply an assistant's hand to the contracting uterus, and keep it there, not only till the close of the third stage, but for a considerable time thereafter; if, finally, we combine Credé's method of placental delivery, with slight traction, if necessary, on the cord, we will rarely indeed have thrust upon us a severe case of hemorrhage. Credé's method of placental delivery commends itself, with much emphasis, to our adoption.*

Occasionally we feel called upon to adopt more specific treatment for the prevention of impending danger. The woman perhaps is a "bleeder," and gives a history of a previous flooding of a most violent type; or, it may be, without any such history, the uterus, from exhaustion of its overworked powers, towards the close of the propulsive stage manifests unmistakable symptoms of inertia. In either case, ordinary routine treatment may prove inadequate to avert the threatened accident. In such occasional instances justice to our patients demands that we bring to bear forces better able to meet and temper the crisis. The pathological condition of the uterus which we fear will be developed as soon as that organ has been emptied, is flaccidity of its walls, which condition affords free escape to the blood circulating within. Now, if there is any

* We may judge of the improvement effected by the introduction of Credé's plan of treatment from the statistics of Bossi (Wiener Medicinische Wochenschrift, Nos. 30–32, 1863), who says that, in the clinical wards at Vienna, where the new method was in every instance adopted, the cases of post-partum hemorrhage amounted only to 1.47 per cent., while in the other wards, where the old line of practice was followed, they amounted to 5.52 per cent.

remedy which is capable of stimulating contraction, without at the same time seriously harming the patient, in the name of humanity it ought to be given. *Ergot* of rye is capable of doing this very thing in the great majority of cases; but to get the effect, it must be administered in appreciable quantities. A single dose of one drachm of the fluid extract (Squibb's preferred) may be given by the mouth, or ten drops of the same may be injected deeply into the tissues. The latter mode of administration is to be preferred, as when so employed the drug acts with greater celerity, certainty and energy.

The time to administer *ergot* as a preventive of post-partum hemorrhage is when the head lies at the pelvic outlet. Delivery may be effected by the forceps, or by the natural efforts, and the placenta subsequently removed. By the time this is done the drug will have produced its effect in the form of firm uterine contraction.

Nevertheless, be it remembered that we consider cases of this kind rare at the most, and rarer still among those who have been under wise homeopathic treatment for a time preceding labor. We should also say for the encouragement of those true apostles of Hahnemann who regard the law under which we practice as universal in its application, that we have never met a case which, in our opinion, required such treatment as we have described, and none which, notwithstanding unfavorable histories of former labors, failed to pass the critical post-partum period without serious blood-loss. At the same time, in specially unpromising cases we should suffer no impugnings of conscience in following the line of treatment before indicated.

Dr. McClintock advocates *rupture* of the membranes. "I have adopted the precaution of rupturing the membranes," he says, "on very many occasions, and am fully persuaded it is a most valuable, and always a feasible, auxiliary in the prevention of flooding after delivery." Dr. Dewees accounted it the principal means to be relied on for the purpose of averting the accident.

Preservation of the membranes till after entrance on the second stage of labor is most emphatically enjoined by some excellent obstetricians as an important factor in the prevention of post-partum hemorrhage; but in our own practice we have not given it the slightest heed.

The following hints on the prophylaxis of post-partum hemorrhage, by Dr. Pryor, we shall do well to remember: "It

is not at all infrequent," he says, "that we are called to attend women who have had hemorrhage following their previous confinements, and who look forward to the close of gestation with fear and trembling, the predisposing causes of hemorrhage during pregnancy and parturition being intensified by the hemorrhagic diathesis. By gaining their entire confidence with the assurance that we possess means of prevention almost infallible, we gain an advantage of no little value as a means of prophylaxis. Take a case where you have reason to apprehend, or where hemorrhage has actually set in: apply a ligature or bandage (about an inch in width) around each extremity, as close to the body as possible, drawing them sufficiently tight to arrest the return of venous blood without materially affecting the arterial circulation, then proceed with your other mechanical as well as medicinal agents." Dr. Pryor puts great confidence in this mode of treatment.

In addition to these means, it is advisable immediately to apply the child to the breast. The close sympathy between the breasts and the uterus gives significance to the act.

The room occupied by the patient should be free from a company of noisy, excited women. Let everything be done decently and in order, without confusion or agitation. The physician, above all, in such an emergency, should keep his emotional nature in perfect subjection. He must not stop to ponder possibilities or probabilities, or to reflect upon his immense responsibilities, for these will be patent enough. He is the presiding genius, and the result largely depends on his executive ability.

Treatment of Hemorrhage of the First Degree.—Under fear, or excitement, the young practitioner is liable to adopt too vehement practices for the arrest of hemorrhages of the first degree. It should be remembered that the last stage of labor is always accompanied with more or less blood-loss, and if not remarkably profuse or prolonged, it need excite no alarm. To apply ice and snow to the abdomen, or carry it into the vagina; to dash cold water over the abdomen, or to pass the hand into the womb for the purpose of checking such a flow, is not only unnecessary, but positively reprehensible. In such cases the fundus uteri should be pressed firmly with the palm of the hand, made cold, if necessary, by dipping in cold water, and in a moment the flow will cease. We should not neglect this procedure for the purpose of administering a remedy, however

well indicated. The most effective treatment of a simple sort must be adopted, or a slight loss may be transformed into a profuse hemorrhage. The womb in such cases seems a little undecided between contraction and expansion, and requires but a suggestion to fix its choice.

In this same class we may properly include that variety of hemorrhage which depends on a laceration of the cervix or vestibule. The flow is not profuse, but is persistent; and firm contraction of the uterus is observed to have little effect on it. The bleeding vessel is effectually controlled by suturing the rent with catgut, in order to do which, when the torn vessels are in the cervix, the uterus must be drawn down to the vulva.

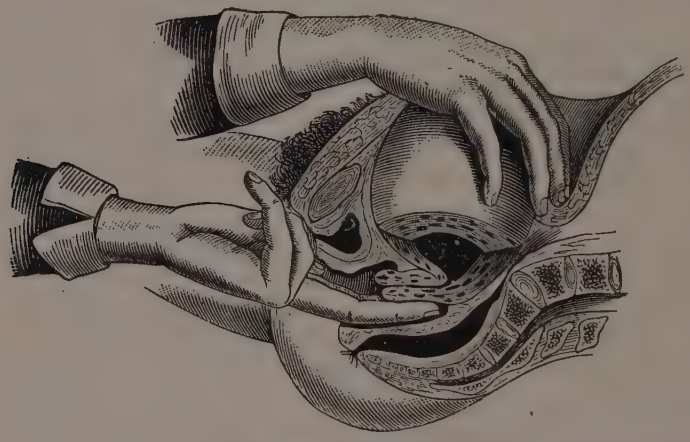


FIG. 255.—Bimanual compression of the Uterus. (After Breisky.)

When for any reason the laceration cannot be thus repaired, and the hemorrhage effectually controlled, a vaginal douche at a temperature of 120° F. may be given. Other treatment will rarely be required.

Vestibular bleeding should be controlled in the same manner.

Treatment of Hemorrhage of the Second Degree.—This consists of manual compression, cold applications, hot vaginal douche, indicated remedies.

First of all, we should compress the uterus and hold it. To do this one hand grasps the organ as felt in the hypogastrium, while the fingers of the other are passed into the vagina, and the uterus is well compressed between them. While thus firmly held, the vessels cannot bleed profusely, and in a few minutes the internal hand may usually be removed without a

recurrence of the flooding. A few doses of the indicated remedy ought to be administered, and the womb held for a few minutes with the abdominal hand, when farther treatment will be unnecessary.

Should there be a return of the flow after removal of the vaginal hand, both hands may be dipped into cold water and replaced. Should this fail to control the flow, the patient must have a vaginal douche with the water at a temperature of 118° to 120° F. Or, what is still more effective, the syringe tube may be carried well into the uterine cavity and the water thrown directly against the fundus uteri. In doing this, neither the uterus nor vagina should be so blocked as to prevent free exit of the return flow.

There can be no reasonable doubt of the efficacy of the closely affiliated remedy in regulating the disturbed vital action, and thereby subduing post-partum hemorrhage; but in view of the extreme liability to error in our choice of remedies, and the certainty with which other measures can be employed, the latter should first be applied, and then reinforced by the former.

Treatment of Hemorrhage of the Third Degree.—Through mismanagement, hemorrhage of the second degree may exceed its bounds and merge into that of the third. Treatment of these appalling cases consists in manual compression, cold applications, hot intra-uterine douches, indicated remedies, electricity, styptic injections, aortic compression.

Firm pressure of the uterus between the hands, as described, must not be neglected, for it is the most important part of treatment. To neglect it here would be as absurd as, in surgery, to neglect to take up a cut artery, while various applications and remedies by the mouth are resorted to in the vain hope that they may prove effectual in staunching the flow of blood.

The relaxed state of the uterus is many times dependent on the existence in utero of coagula, and firm condensation cannot be acquired and maintained until they are removed. Accordingly it is set down as one of the most important principles of treatment, *thoroughly to evacuate the uterus.*

Cold water may be used as before indicated, or, instead of it, ice may be applied to the abdomen and introduced through the vulva, or, if thought requisite, even into the uterine cavity. Some have recommended pouring cold water from a height on the abdomen, but the advisability of so doing is questionable, save in the case of warm, vigorous women. Much harm may

be done by an injudicious use of cold. Let it be remembered that refrigerants derive their efficacy mainly from the first impression which they make, and long continuance of them is unwise.

The other extreme of temperature is still more fruitful of good results. Applied to the lumbo-sacral region, hemorrhage from the womb is sometimes speedily arrested by it. We have found hot water a most efficient means for controlling uterine hemorrhage, when injected directly into the uterine cavity. There is little or no danger connected with the operation, provided there be no obstacle to free escape of the injected fluid. Immediately after labor the os uteri is so wide that the water can easily flow away, and the uterus at such a time will safely tolerate thorough irrigation. When the operation is undertaken, the nozzle of a fountain syringe should be passed through the os uteri to the fundus, against which the stream will be directed.

"One of the essentials to a safe administration of an intra-uterine injection," we say in a recent article on *The Use of Hot Water in Obstetrical Practice,* "is a good syringe. I have used the 'bulb' syringe, but greatly prefer the 'fountain,' or some other instrument which acts on the siphon principle. The syringe should be either new or thoroughly clean and aseptic. If my choice were between an old syringe, the cleanliness of which could not be guaranteed, and the administering of no injection, I would say, 'I will withhold the syringe and rely for help on other measures.'

"The water should be hot, as hot as can be borne, namely, 115° to 122° F. temperature; when of a lower temperature it does little good. The tube ought to be carried nearly to the fundus uteri and the stream given but moderate force. The quantity of water will be regulated by circumstances. In one case two gills may answer, while in another a gallon may be required. We commonly get prompt effects; but now and then relief comes slowly.

"Very hot water produces its hemostatic effects in uterine hemorrhage not alone by local action, but also by virtue of reflex excitement. The primary effect on the blood-vessels is contraction, and hence the prompt response usually obtained. The flow of blood ceases almost as soon as the stream of water strikes the fundus uteri, towards which it should be directed. The calibre of both large and small vessels is at once

diminished, thereby greatly reducing the loss and bringing it within normal limits.

"While this is the result usually obtained, doubtless it would be but temporary were not other and permanent action at the same time, and by the same means, brought about. Not only are the blood-vessels greatly diminished in their carrying capacity by contraction of their circular fibers, but, through reflex action, forcible contraction of the whole bleeding organ is excited, and the alleviation thus rendered permanent."

Ergot has been recommended as a remedy for all forms of dangerous uterine hemorrhage, and yet there appears to be little place for it here. Hemorrhage of the third degree generally runs its course too rapidly for us to expect much aid from the remedy, especially when administered through the mouth, and the other degrees of hemorrhage do not require it.

Despite the treatment above recommended, flooding may continue, or be no more than temporarily subdued, and for such cases we have further expedients which have many times availed to save life. Styptic intra-uterine injections of various substances have been recommended, but that which has afforded the best aid is the *perchloride of iron*. One of the strongest advocates of such treatment is Dr. Robert Barnes, and we append his formula and mode of application. "Solid ferric chloride 1 ounce, dissolved in 10 ounces of water, or the liquor ferri perchloridi (Br. Ph.) 1½ ounces, water 7½ drachms. The rules in using it are: (1) be sure that the uterus is empty of placenta, blood, and clots; (2) compress the body of the uterus by the hand during the injection; (3) have two basins at hand, one containing hot water, the other the ferric solution; pump water well through the syringe—a good Higginson's will do—so as to expel air; then pass the uterine tube into the uterus, and inject first hot water, so as to wash out the cavity and give a last opportunity for evoking diastaltic contraction; then shift the receiving end of the syringe into the ferric solution, and slowly, gently inject about seven or eight ounces, carefully keeping up steady pressure on the uterus throughout and afterwards."

Intra-uterine injections of vinegar have been used with good effect, while a strong solution of alum has been equally efficacious.

In desperate cases, compression of the abdominal aorta has served to arrest the flow. This can be done through the ab-

dominal walls, the vessel being easily felt pulsating on the left side of the spine. It may also be done in a thoroughly relaxed uterus by the hand which is slipped into the cavity of the organ; but we should advise against the method. Long-continued compression is unwise, but a brief arrest of the hemorrhage will give time for coagulation of blood in the bleeding vessels, which may serve permanently to arrest the flow.

Electricity.—The Faradic current has a powerful effect upon the uterine muscular fibers, inducing firm contraction. A battery is rarely at hand, but when one is to be had at the critical moment, its aid should be invoked. The operator's hand makes a fair, though not a very comfortable, intra-uterine electrode, but the current is quite as effective when one electrode is applied to the sacrum, and the other to the hypogastrium. A metal, or carbon, intra-uterine electrode would, of course, be far preferable.

The caution elsewhere given may be repeated here:—the physician must beware how he interferes in those cases where the loss has been excessive, but has temporarily ceased. It is the last ounce of blood that kills. It may be that syncope has ensued, and the feeble circulation which characterizes the condition has led to the formation of coagula. To excite the circulation, or to interfere with the clots, may awaken renewed flooding. Therefore withhold the hand, and attentively watch the case. Renewed strength, or renewed hemorrhage, will indicate the moment for interference. The woman rallying sufficiently to bear the strain, we may empty the uterus and stimulate permanent contraction. The hemorrhage returning, we may take like action effectually to arrest it. Therefore, when there is syncope, we should not hastily begin stimulation, but guard against complete cardiac failure. Should dangerous symptoms ensue, stimulate well. For this purpose the hypodermic administration of *sulphuric ether* and of *glonoine* has proved efficacious.

Tamponing the uterus with iodoform gauze has been practiced to a limited extent, but we cannot yet look upon it with approval.

Transfusion.—When the first edition of this work was published, we hoped that transfusion of blood for the relief of profound anæmia after flooding would soon prove successful in practice; but nothing encouraging has thus far been accomplished.

The subcutaneous injection of a solution of chloride of sodium has been practiced with some success, and, when carefully performed, doubtless helps to supply the hungry vessels with a circulating fluid so as to prevent absolute collapse. The solution should be of a strength of 6 parts to 1,000, the points of injection are the subclavicular and inter-scapular regions, and the quantity introduced, from six to thirty ounces. It is given by means of a glass funnel with rubber tube and a fine needle. The solution must be of a temperature of 100° F., and it is carried into the tissues by the mere weight of the column of fluid.

The Treatment for Concealed Hemorrhage, Post-partum, differs in no material respects from that already given for external bleeding. As soon as the condition is recognized, the distended uterus is to be compressed with the hand from above, and the discharge of its contents enforced. The hand should then be introduced, and all retained coagula removed.

Secondary Hemorrhage requires the application of similar principles of treatment, it being quite essential that the womb be well emptied. This form of flow, depending, as it does in many cases, on retained parts of placenta, will generally require introduction of the hand, though if manifested at a considerable interval after labor, the fingers alone will answer. After removing a retained fragment it is well to wash out the uterine cavity with a hot antiseptic douche.

For the sub-involution existing in such cases, *secale cornutum* is probably the best remedy, *Trillium* or *trillin* is nearly as efficacious. Other remedies may be indicated by special symptoms.

The following summary of treatment for post-partum hemorrhage may be found convenient:

PREVENTIVE TREATMENT.—Observe the rules for the conduct of normal labor.

Administer indicated remedies.

Give *ergot* by the mouth, or by hypodermic injection, just before the close of the second stage of labor, in extremely threatening cases. Do not remove the placenta too soon. If not naturally expelled, combine *expression* with *extraction* for its delivery.

Apply the child to the breast.

CURATIVE.—*General.*—Lower the head and elevate the hips.

Have the room quiet.

Be calm and self-collected.

Primary Hemorrhage—1st Degree.—Press on fundus uteri with cold hand.

Avoid vehement practices.

Administer indicated remedy.

Suture torn cervix or vulva when torn vessels bleed.

2d Degree.—Compress the uterus between the hands and empty it.

Use cold applications.

Use hot vaginal, or intra-uterine, douche.

Give indicated remedies.

3d Degree.—Compress the uterus between the hands, and empty it.

Use cold applications,—ice, if necessary.

Use hot intra-uterine douche.

Give indicated remedies.

Use electricity.

Styptic injections.

Aortic compression.

Secondary Hemorrhage.—Empty uterus and treat as other forms.

CHAPTER XVII.

PARTURIENT ANOMALIES ARISING IN THE THIRD STAGE OF LABOR—Continued.

Retained Placenta.—In practice we have found this term of variable significance. Especially is this true in consultation practice where one has an opportunity to examine the different cases wherein this is said to be a complication. It resolves itself into this, namely, what one accoucheur regards an example of true retention, another may discover to be only an instance of little more than ordinary difficulty. Through misapplication of the principles of placenta delivery, or from want of due energy in the application of them, the placenta may become practically retained. Without reference to efforts at delivery such as we have recommended as appropriate to every case, mere traction is sometimes made with the effect to invert the placenta and bring it to the os uteri in such a way as to prevent entrance of atmospheric air, and make the retentive powers of the uterus extremely difficult to overcome. In exercising pressure, the uterus, instead of being crowded downwards towards the pelvic cavity with the hand grasping the fundus, is merely flattened from before backwards, or from the opposite direction. In a number of instances when we have been called to deliver what was said to be a retained placenta, we have found it in the vagina, only awaiting easy removal.

When Credé introduced his method of placental delivery he declared that "the spectre of adherent placenta would be scared away." True placental retention from any cause, after labor, at or near term, we regard as extremely rare.

There are three causes of retention:

Irregular uterine contraction; abnormal adhesions, due in most instances to former endometritis; want of firm uterine contraction.

TREATMENT.—When the placenta cannot be gotten away by firm pressure of the uterus, coupled with judicious traction on the cord, within what may be regarded as a reasonable time, other measures must be employed, for long retention is a dangerous complication.

No hard and fast rule should be laid down for our guidance concerning the time for manual delivery of the placenta. Each

case must be decided on its own merits. The "reasonable time" of which we have spoken may in one instance be only thirty minutes, while in another it may be two hours.

Before resorting to artificial separation and extraction, we should for a time try the effect of remedies, fitly chosen, and meanwhile keep the case under attentive surveillance.

If the retention is not overcome by these measures within an hour, we believe it is wise, in the absence of contra-indicating symptoms, to pass the hand partially or wholly into the uterine cavity for the purpose of removing the after-birth. A digital examination will indicate the advisable course to follow. The four fingers may be entered, if necessary, and if a border of the placenta can be reached, it should be drawn down, when, if no morbid adhesions exist between that organ and the uterus, compression of the latter and slight traction on the cord will suffice to secure delivery



FIG. 256.—Irregular Uterine (hour-glass) Contraction, with retention of the Placenta.

Injection of the umbilical cord to its full capacity is said sometimes to arouse the uterus to contraction, and thereby bring about separation of the placenta; but we have never tried it.

If such efforts fail, the fingers may be pushed onwards into the uterine cavity, and separation undertaken. By beginning at the margin, we shall soon succeed in our endeavors. In some cases, however, small fragments are so firmly adherent as to require the dull curette for their removal. If every part of the placenta is adherent, it cannot well be detached without tearing it into sections.

If irregular uterine contractions are found, they should be overcome by manual dilatation to a degree sufficient to admit of separation and removal of the secundines.

After the adhesions are overcome, the placenta and hand should not be withdrawn until the uterus is disposed to contract, and even then the latter must be followed down with the abdominal hand, and held for several minutes.

The entire operation should be performed without hurry, as otherwise the uterine structures may suffer from needless traumatism.

If done under rigid antiseptic precautions, the operation,

save in those cases which require a good deal of effort to peel off an adherent placenta, is comparatively harmless.

Acute Inversion of the Uterus.—This is a comparatively infrequent accident of labor. In the Rotunda Hospital, London, out of 190,800 cases it was seen but once. The only instance of the kind which has fallen under our notice was in consultation practice, and was reported to the Clinical Society of Hahnemann Hospital some years ago.

It consists in turning the uterus inside outwards, as we would invert the finger of a glove.

There are two varieties, the complete and the incomplete.



FIG. 257.—Incipient Inversion.

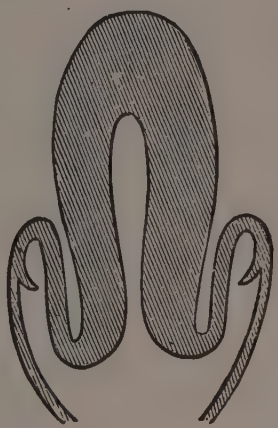


FIG. 258.—Showing commencement of Inversion at the Cervix.

In the former the organ presents by its inner surface at the vulva, and may even protrude between the thighs.

There is no doubt that the accident has in many instances occurred as the result of too forcible traction on the umbilical cord. In our own case this was the evident cause, the woman having been delivered by an ignorant midwife. The traction which produces inversion is not always voluntary. The cord may be so short that delivery cannot be completed without considerable strain on it, while again, birth taking place when the woman is on her feet, as occasionally happens, the falling fœtus gives it a strong pull.

It may arise also from inattention to the condition of the

uterus while pressure is being exerted on the fundus uteri for the purpose of delivering the after-birth. If the organ is relaxed, its fundus may be indented like a hollow rubber ball.

Dr. Tyler Smith believes that the accident may be occasioned by irregular uterine contraction, independently of every other circumstance.

Inversion may begin at the cervix, instead of the fundus uteri, as pointed out by Duncan, and in some cases become complete.

Symptoms.—Dr. Meadows, who has met two cases of the kind, gives the symptoms so clearly, and yet concisely, that we quote him here. "The symptoms of inversio uteri are generally pretty well marked, and are, always, of a serious and alarming character in proportion to the amount or degree of inversion; they have reference chiefly to the nervous system, which gives evidence of very severe shock. In the slighter cases there is great pain, of a dragging or bearing-down character, situate chiefly in the back and groins, with more or less hemorrhage—'the patient suffers under an oppressive sense of sinking, with nausea or vomiting, cold clammy sweats, feeble, fluttering, or nearly extinct pulse, faintings, or even convulsions.' These are the kind of symptoms which always occur to a greater or less extent; but 'the most universal symptom is a sudden exhaustion, which comes on immediately after the inversion.' The amount, both of the hemorrhage and of the pain, varies: they are greater in the complete than in the incomplete version; and, as a general rule, though the symptoms are less severe in appearance in the latter than in the former, they are not so in reality, for the shock to the nervous system has been so great that, in some instances, the patient has died almost immediately.

"On examining the abdomen, we shall probably not be able to feel the uterus at all, while *per vaginam* a round hard tumor will be felt, which may be visible even beyond the external parts. It is of a bright red color, its surface being smooth and bleeding; the size of the tumor will vary with the amount of inversion, and partly also with the time which has elapsed since it took place. In recent cases, there is generally a good deal of swelling, possibly from the return of blood being prevented by the narrow constriction of the now inverted os."

Diagnosis.—The only condition with which acute inversion of the uterus is very liable to be confounded is that of uterine

polypus. From this it will be distinguished by the absence of the contracted uterus from the hypogastrium, and the utter inability to pass the uterine sound. Should the placenta remain adherent, as sometimes happens, it would serve to dispel any doubt concerning the inversion which might otherwise exist.

Treatment.—The following we borrow from Playfair: "The treatment of inversion consists in restoring the organ to its

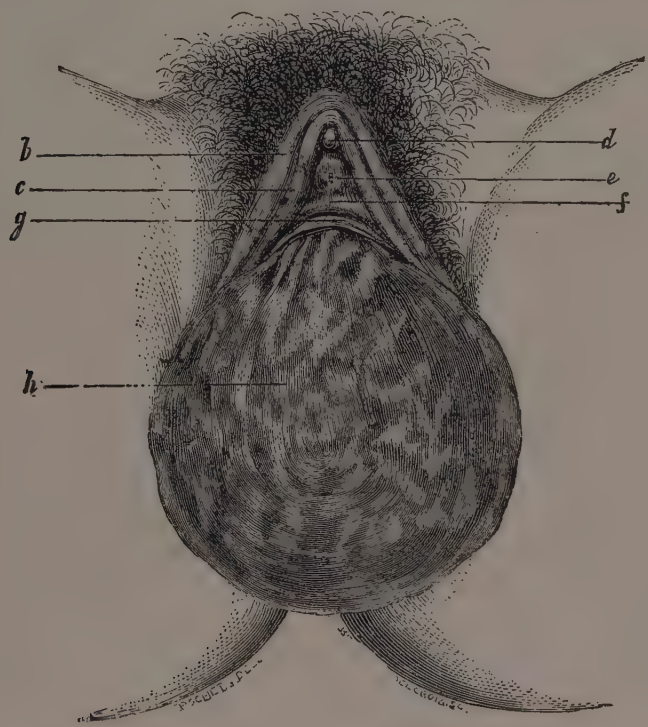


FIG. 259.—Complete inversion of the Uterus. (Boivin and Dugès.) *d*, clitoris. *h*, mucous surface of inverted organ. *b*, right labium majus. *c*, right labium minorum. *e*, meatus urinarius.

natural condition as soon as possible. Every moment's delay only serves to render restoration more difficult, as the inverted portion becomes swollen and strangulated; whereas, if the attempt at reposition be made immediately, there is generally comparatively little difficulty in effecting it. Therefore, it is of the utmost importance that no time should be lost, and that we should not overlook a partial or complete inversion. Hence the

occurrence of any unusual shock, pain, or hemorrhage after delivery, without any readily ascertained cause, should always lead to a careful vaginal examination. A want of attention to this rule has too often resulted in the existence of partial inversion being overlooked, until its reduction was found to be difficult or impossible.

"In attempting to reduce a recent inversion, the inverted portion of the uterus should be grasped in the hollow of the hand and pushed gently and firmly upwards into its natural position, great care being taken to apply the pressure in the proper axis of the pelvis, and to use counter-pressure, by the left hand, on the abdominal walls. Barnes lays great stress on the importance of directing the pressure towards one side, so as to avoid the promontory of the sacrum. The common plan of endeavoring to push back the fundus first has been well shown by McClintock to have the disadvantage of increasing the bulk of the mass that has to be reduced, and he advises that, while the fundus is lessened in size by compression, we should, at the same time, endeavor to push up first the part that was less inverted, that is to say, the portion nearest the os uteri. Should this be found impossible, some assistance may be derived from the manœuver, recommended by Merriman and others, of first endeavoring to push up one side or wall of the uterus, and then the other, alternating the upward pressure from one side to the other as we advance. It often happens as the hand is thus applied, that the uterus somewhat suddenly reinverts itself, sometimes with an audible noise, much as an India-rubber bottle would do under similar circumstances. When reposition has taken place, the hand should be kept for some time in the uterine cavity to excite tonic contraction; or Barnes' suggestion of injecting a weak solution of perchloride of iron may be adopted, so as to constrict the uterine walls, and prevent a recurrence of the accident.

"It is hardly necessary to point out how much these manœuvers will be facilitated by placing the patient fully under the influence of an anæsthetic.

"There has been much difference of opinion as to the management of the placenta in cases in which it is still attached when inversion occurs. Should we remove it before attempting reposition, or should we first endeavor to reinvert the organ, and subsequently remove the placenta? The removal of the placenta certainly much diminishes the bulk of the inverted por-

tion, and, therefore, renders reposition easier. On the other hand, if there be much hemorrhage, as is so frequently the case, the removal of the placenta may materially increase the loss of blood. For this reason, most authorities recommend that an endeavor should be made at reduction before peeling off the after-birth. But, if any difficulty be experienced from the increased bulk, no time should be lost, and it is in every way better to remove the placenta and endeavor to reinvert the organ as soon as possible.

"Supposing we meet with a case in which the existence of inversion has been overlooked for days, or even for a week or two, the same procedure must be adopted; but the difficulties are much greater, and the longer the delay, the greater they are likely to be. Even now, however, a well conducted attempt at taxis is likely to succeed. Should it fail, we must endeavor to overcome the difficulty by continuous pressure applied by means of caoutchouc bags, distended with water and left in the vagina. It is rarely that this will fail in a comparatively recent case, and such only are now under consideration. It is likely that by pressure applied in this way for twenty-four or forty-eight hours, and then followed by taxis, any case detected before the involution of the uterus is completed may be successfully treated."

In our own case the inversion had existed for some two or three days when we first saw the woman. The pulse was rapid and the temperature high, besides which the lochia were fœtid. Reposition was effected by means of Guernsey's uterine elevator, after a fruitless attempt with the fingers. The patient made a good, but slow, recovery.

Several cases are on record in which efforts at reposition were unsuccessful, but in which, nevertheless, spontaneous reposition subsequently took place.

Suspended Animation, or Asphyxia Neonatorum.—Asphyxia of the fœtus may be brought about in several ways. While the child remains wholly in utero, its supplies of oxygen are received through the utero-placental circulation; but when expulsion has taken place, and in some cases even before it is completed, they are obtained in the usual manner through the pulmonary structures. Hence anything occurring during intra-uterine life to interrupt the utero-placental circulation, and anything intervening during complete or incomplete extra-uterine existence to obstruct respiration, will give rise to asphyxia. It follows that we have among the causes of intra-

uterine asphyxia, premature separation of the placenta, compression, stenosis and torsion of the umbilical cord; and among the causes of extra-uterine asphyxia, the presence of mucus and fluid in the throat and lungs, and retraction of the tongue. Long continued interruption of the fœtal circulation, and the presence of mucus in the throat from premature respiratory efforts, are the most common causes. We should add, however, that premature interruption, or lowering of the fœtal circulation, not only deprives the fœtus of its necessary supplies, but the very interruption stimulates respiratory efforts, which result only in filling the lungs with mucus, blood, and liquor amnii, thereby adding to the gravity of the case.

"Experience has shown," says Schrœder, "that pressure on the brain during labor may be attended by the most serious consequences to the child. It remains to be seen in what way these unfavorable results of cerebral pressure can be explained. It may well be doubted whether pressure upon the medulla oblongata so irritates it as to produce the first inspiratory movement; at any rate, prolonged cerebral pressure, through irritation of the vagus, slackens the pulse and diminishes the irritability of the medulla oblongata because the exchange between the maternal and the fœtal blood is impeded, and, consequently, the blood circulating in the fœtus is poorer in oxygen. By cerebral pressure, therefore, the child becomes comatose, and this may assume such a degree that the usual irritations are no longer able to produce inspiratory movements. The child is exposed to such a danger by compression of the head within a contracted pelvis, or by the firmly compressed forceps." Effusion of blood into the hemispheres is well borne by new-born infants; but effusion at the base of the brain is fatal.

Morbid Anatomy.—Schultze describes two stages—*asphyxia livida* and *asphyxia pallida*. Some writers speak of them as distinct forms of asphyxia, but we regard them as different stages of the same process. In the first stage, tonicity of the muscles remains, and reflex movements are easily excited. The skin is dusky-red, the cutaneous vessels are turgid, and the eyeballs protrude. The heart beats slowly, but forcibly. Spontaneous respiration is often set up, or can usually be excited without much difficulty. In unfavorable cases the child soon passes into the second stage.

In the second stage, or *asphyxia pallida*, the child is anæmic, the body cold and limp, and the sphincters are relaxed. Reflex

movements cannot be excited. Pulsation is rapid and feeble. Inspiratory efforts if made at all, are feeble, and are not participated in by the facial, nasal, or maxillary muscles.

Diagnosis and Prognosis.—Schultze claimed to have practiced auscultation of intra-uterine respiration with success, while many have heard the intra-uterine cry (*vagitus uterinus*). Diminished frequency and force of the fœtal heart-sounds, persisting during the intervals between pains, indicates the beginning of asphyxia. When delivery has been partially effected, the failing pulse and the cyanosis give evidence of the condition. Dr. Garrigues reports a case of asphyxia wherein he practiced artificial respiration for a period of two and a half hours before the child made the first respiratory gasp. It died seven hours later. Poppel found that the mortality of asphyxiated children in the first eight days after delivery is seven times greater than that of the unasphyxiated, and the mortality in the first week is in direct ratio to the duration and gravity of the symptoms attending the asphyxia.

TREATMENT.—There are three indications for treatment, namely: 1. The child must be brought as rapidly as possible into a position to inspire atmospheric air. 2. Impediments to respiration must be removed from the air passages. 3. If the irritability of the medulla oblongata has been so weakened that no spontaneous inspirations, or only very feeble ones, are made, the normal condition of the central organ must be restored by artificial respiration.

With respect to the first indication, no special directions are necessary, as the various modes of accelerating labor have received attention in other chapters.

Mucus may be cleared from the throat by inverting the body, and passing the finger over the base of the tongue.

In those simple cases where the child does not at once breathe, yet the heart and cord pulsate normally, a slap on the nates, simple elevation and lowering of the arms a few times, or the sudden application of heat or cold, will suffice to arouse the respiratory forces.

The third indication alluded to may be accomplished by several methods.

Sylvester's Method.—This consists in drawing forward the tongue, placing the infant on its back, and extending the arms above its head. This movement, which favors inspiration, is then followed by bringing the arms down to the sides and com-

pressing the thorax. These movements should be repeated about twenty-five times per minute.

Marshall Hall's Method.—Place the child in a prone position, which favors expiration by compressing the chest. Then roll it onto its right side, which expands the thorax. These movements should be repeated a like number of times per minute as the foregoing.



FIG. 260.—Schultze's method. (Inspiration.)

Schræder's Method.—In this method inspiration and expiration are produced by alternately extending and flexing the spine in the following way: "The thorax can be dilated by supporting the back; the head, pelvis and arms being allowed to fall backwards. A powerful expiration is then obtained by bending the child over the abdominal surface, thereby compressing the thorax."

Schultze's Method.—It consists of the following manipulations: If the heart is beating strongly, and the child is only in the livid stage of asphyxia, the cord is not cut, but the mouth is cleared out, and cold water spurted on the pit of the stomach and nape of the neck. If the heart's action is weak to begin with, or becomes weak, the cord is severed, two or three teaspoonfuls of blood are allowed to escape, and the child is dipped suddenly up to the neck in cold water. If this fail, or if the child be born in the pallid stage, after dividing the cord, clearing the throat and pulling forward the tongue, the accoucheur puts the child through the following movements: It is so held between the legs of the accoucheur, if sitting, or in front of him if standing, that the thumbs are placed upon the anterior surface of the thorax, the index finger in the axilla, and the other fingers along the back; the face of the child is turned away from the accoucheur. The child, thus grasped, is then swung upwards, so that the lower end of the trunk turns

over towards the accoucheur, and by bending the trunk in the region of the lumbar vertebræ, the thorax is greatly compressed. By such passive expiratory movements the inspired liquids pass abundantly out of the respiratory opening. A very powerful inspiration is then produced by extending the body of the child by swinging it backwards so as to return it to its previous position. In this way expiration and inspiration are repeated until they become spontaneous.

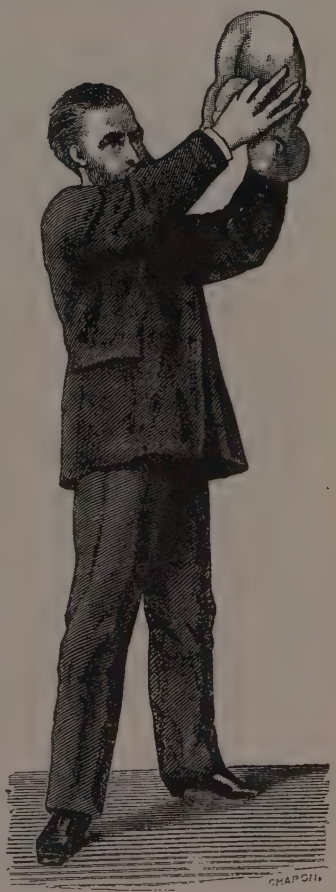


FIG. 261.—Schultze's method. (Expiration.)

The success of this method depends on careful attention to the following points: (1) The first movement must be that of expiration, as otherwise the fluids will be drawn still deeper into the air passages. (2) The downward movement must be a sharp swing, or the effect on the diaphragm will be almost wholly lost. (3) If when making the downward movement there is no sound of air entering the lungs, we are to infer either that the swing has not been powerful enough, the hands have prevented free movement of the chest walls, or the glottis is closed. If the latter prove to be true, the catheter should be introduced and held in place while the swinging is resumed.

Howard's Method.—The child is laid on its back on the operator's left hand, the ball of the thumb supporting the back and extending the spine, thereby causing the shoulders to droop and the head to bend downwards and backwards. The buttocks and thighs are supported by the operator's fingers. The thorax is then grasped by the right hand, and by means of it, while the left affords counter-pressure, the chest is compressed, and allowed to expand, at the rate of from seven to ten times per minute.

Pacini's Method.—In this the feet are fixed, and the operator standing with the head against his own body, seizes the arms at the axillæ and pulls the shoulders upwards and forwards, then allowing them to return to their natural position. This movement is to be repeated fifteen or eighteen times per minute.

Comparative Value of These Methods.—Some years ago, Dr. F. H. Champneys, of St. George's Hospital, London, instituted a series of experiments on the bodies of new-born children to determine as far as possible the relative quantity of air drawn into the lungs in the practice of these and other methods. Following are his conclusions: Since the position of equilibrium of a still-born child's chest is one of absolute expiration, airlessness, or collapse, no method which depends on elastic recoil of the chest walls will introduce air into the lungs. The methods of Marshall Hall and Howard are useless as means of directly ventilating the lungs of still-born children. Sylvester's method, and its modifications by Pacini and Bain, introduce more air into the lungs than any other method. Schrœder's method is useless. Schultze's plan, although its power of ventilation is less than that of Sylvester and its modifications, yet acts efficiently.

We prefer Sylvester's method for ordinary cases, and Schultze's for the graver ones.

After respiration has been established, the child must be watched until it has gained its natural red color, moves the limbs actively, and cries with a loud voice.

CHAPTER XVIII.

OBSTETRIC OPERATIONS.

The Induction of Premature Labor.—This operation, introduced by English obstetricians more than a century ago to conserve the interest of both mother and child, may be employed with benefit in three varieties of cases: (1) In moderate degrees of pelvic deformity. (2) In diseases which imperil maternal life. (3) In habitual death of the fœtus.

Prognosis.—Artificial interruption of the orderly progress of gestation is always attended with increased risk to the woman. According to the most reliable statistics, about 5 per cent. of the mothers and 50 per cent. of the children are lost. Statistics based exclusively on the more advanced methods of management of both mother and child would doubtless show a much smaller mortality. In the same connection we are to recollect that the operation is performed in a large percentage of cases to facilitate the delivery of fœtuses through contracted pelves, in which parturient dangers are great without reference to induced action.

Methods of Operating.—There are a number of methods by means of which uterine contractions can be provoked, but they differ considerably in their applicability to particular cases, their general efficiency and their safety. Those which we shall mention are among the most approved.

Rupture of the Membranes.—This is effective but not always prompt. It is the oldest, and also the safest when applied in suitable cases. If the premature labor is being induced because of pelvic deformity, we should beware of destroying all hope of easy version by removal of the amniotic fluid.

At this period in pregnancy the operation is best performed in most instances by means of a sound or catheter, but the finger is always to be preferred when it can be employed.

Artificial Dilatation of the Os Uteri.—In these cases it is chiefly the internal os which offers resistance. Tents are dangerous instruments, and their use should be discountenanced. We regard the finger, and well constructed rubber dilators, as far preferable. The finger is less likely to do harm than any instrument which can be used, but it cannot always be made to penetrate the internal os without the employment of unwarrant-

able force. If this is true, a steel dilator should be carefully used when Barnes' bags can be made to carry the dilatation to a point where nature will readily complete it.

Introduction of a Catheter or Bougie.—For this purpose a soft rubber catheter is to be preferred, but a gum-elastic one will answer the purpose. When the former is chosen, a stylet will be required to give it sufficient stiffness to make sure of penetration. In multiparæ the operation is not at all difficult; but in primiparæ it is not so easy. For convenience' sake the woman should be drawn to the edge of the bed and placed in the lithotomy position. Using the fingers as a director, the point of the instrument is carried within the os uteri, and then turned to one side so as to avoid rupturing the membranes. After deep penetration, the stylet should be withdrawn and the catheter left. The soft catheter can be curled up so that its proximal extremity will be within the vagina; but the protruding end of the gum-elastic instrument should be cut off.

This operation is quite safe when done under antiseptic precautions; and is usually effective. Uterine action is set up within a few hours. It is often adopted as a supplement to another operation, such as Kiwisch's douche, or Faradization.

Intra-Uterine Injections.—For this purpose a gum-elastic catheter is introduced between the membranes and uterine walls, for a distance of about two or three inches, or farther, and through this a few ounces of water, at about the temperature of the body, is injected. If the first injection fails to excite uterine action, it should be followed by another. The use of this method has several times been attended with sudden death, attributed to entrance of air into the uterine veins, to shock, and to rupture of the uterus, and hence has not received professional approval.

Cervical Douche.—Kiwisch's douche consists in directing a continuous stream of warm water against the os uteri by means of a tube connected with a fountain syringe, or an apparatus which operates on the same principle. Some prefer the alternate use of hot and cold water. The injection should be repeated once or twice a day, for ten or fifteen minutes at a time, until uterine contractions are excited. Twelve are said to be about the average number required. In urgent cases they may be employed every three or four hours; but the method is not well adapted to cases in which rapid delivery is desirable.

This method has by some been changed, measures being

taken to prevent escape of the injected fluid from the vagina, with a view to effecting anatomical detachment of the membranes from the uterine walls; but the innovation has proved a dangerous one. The operation as originally recommended is comparatively free from risk, but is often provokingly slow in its action. At one time the method was extremely popular, but it has now fallen into comparative disuse, except as a means of effecting preliminary dilatation of the os. Still we regard it as a very appropriate one for certain exceptional cases.

A much more rapid and far more effective method is that described by Thomas. "The method of inducing premature labor which I now invariably adopt," he says, "is very simple, and, at the same time, a perfectly efficient one. The patient is placed across the bed, with the buttocks near the edge, and under her is arranged a large piece of rubber or oil-cloth in such a way as to drain into a tub on the floor. In this tub we put one or two gallons of water of a temperature of 98° F. The operator stands between the thighs of the patient, whose knees should be properly supported, and employing a syringe with a long nozzle, which is carried up as far into the cervical canal as it will go, he keeps a steady stream directed against the membranes. In the course of ten minutes the os will be the size of a silver half dollar, and when dilatation to this extent has been accomplished, he is to insert a gum catheter between the membranes and the uterine walls. The patient is then put in bed, and that is all."

Dr. Schrader, of Hamburg, has published a method of inducing premature labor, based on his observation that cold is a greater excitant of the nervous, and consequently also of the muscular, system, than warmth. Continuous irrigation at the temperature of 45° F. is impracticable on account of the pain it causes, but a cold douche, alternating with a warm one, can be borne. Dr. Schrader connects a vaginal glass tube, by means of a T-shaped piece and the necessary india-rubber tubes, to two irrigators, one of which contains the cold, and the other the warm water. By allowing now one instrument and now the other to work, cold or warm water may be sent through the vaginal tube into the vagina. Two people are required—the one to fill the irrigators, the other to work the douche. For each sitting about twenty-four liters of cold, and half the quantity of warm water, at 112° F., are required, and the douche has a fall of about one meter and a half. The irrigation

begins with the warm current, and, before the cold water is turned on, pressure is made on the perineum with the vaginal tube, so as to allow all the warm water to run away from the vagina. The same plan is observed before the change from cold to warm, by which means the alteration in the temperature as felt by the patient is always sudden. Each time about two liters of cold and half the quantity of warm water are used. The douche is generally repeated about every hour and a half until labor is active enough to make its continuance probable. Of eighteen women treated by this method exclusively, and four others who were partly so treated, one died of eclampsia twelve hours after delivery, but all the others made a good recovery. The eighteen women who were treated by the douche exclusively, had twenty children, of whom fifteen, that is, seventy-five per cent., were alive. These cases required on the average ten douches and a half; in half the number three douches and a half were sufficient.

Introduction of Foreign Bodies into the Vagina.—Braun's colpeurynter, Gariel's air pessary, and the ordinary tampon, have been used as means of inducing premature labor. The effect is excitation of reflex uterine action, and more or less mechanical dilatation of the os uteri, with separation of the membranes. These measures, tolerably safe and certain when carefully employed, are not highly regarded by the most skillful. Distension of the vagina should not be excessive, and must not be long-continued or the vaginal tissues will be liable to suffer.

Use of Electricity.—Electricity is an efficient means of bringing about premature interruption of pregnancy. The Faradic current, by exciting contraction of the muscular fibers, proves of greater service in this direction; though the galvanic current has been successfully employed. With the anode on the lumbar region, and the cathode on the abdomen, a mild current should be administered for fifteen or twenty minutes, and repeated at short intervals until uterine action is well established.

The Induction of Abortion.—The physician is certainly justifiable in inducing abortion whenever the operation offers the best chance of saving the woman's life, but only after due consideration, and when his conviction of its advisability has been strengthened by counsel. The main conditions which unite to demand the operation are: (1) Incarceration of the prolapsed or retroflexed uterus, when the dislocation cannot be

reduced, and (2) Diseases of pregnancy which greatly endanger life, and which have refused submission to all carefully chosen remedies.

We believe it is equally justifiable to induce abortion in those cases of extreme pelvic deformity, or of pelvic tumors, which are quite sure to make the performance of abdominal section a necessity, should pregnancy be permitted to go on.

The operation is performed by introducing a sound, and sweeping it about in the uterine cavity; by introducing a soft catheter; or better still, by the intra-cervical use of electricity.

CHAPTER XIX.

OBSTETRIC OPERATIONS—Continued.

Turning.—Turning consists in the performance of a manœuver by means of which one presenting part is exchanged for another, as when the head, in a case of placenta prævia, is converted into a footling presentation, or the shoulder, in a transverse case, is changed into a cephalic presentation.

Two general varieties of turning are practiced, namely, the *cephalic* and the *podalic*. Among the ancients, cephalic version only was practiced, under the mistaken idea that labor could not well be terminated with the pelvic extremity in advance. The form of version now most popular, and which in general is more easily and safely performed, is the podalic, which consists in bringing down the feet when some other part presents, and thereby converting the case into a footling presentation.

CONDITIONS CALLING FOR THE OPERATION.—The circumstances which unite to designate this as the suitable operation are various. Resort is sometimes had to it as a speedy means of delivery in urgent cases, while in other instances it constitutes the only means of terminating labor without mutilation of either mother or child, and is so recognized from the start, though not hurriedly adopted. Among the conditions demanding this sort of interference we may mention placenta prævia, transverse presentations, certain degrees of pelvic contraction, prolapse of the funis, sudden death of the mother, and some cases of uterine rupture.

FAVORABLE CONDITIONS.—The most prominent of these is retention in utero of the amniotic fluid, to which we may add leisurely and unenergetic action of the uterus. Version by external manipulation should not be undertaken after the amniotic sac has been emptied, but version by the internal method can many times be done with comparative ease when the waters have not long been absent. For all but external version it is essential that there be a certain amount of cervical dilatation, or at least cervical relaxation.

CEPHALIC VERSION.—This form of version is not often practiced, chiefly for the reasons that it requires the concurrence of so many favorable conditions, and that the circumstances which necessitate version are usually of so pressing a character as to

require the speedy termination of labor, a thing not always easily accomplished in connection with cephalic version. Still, in some favorable cases it is the preferable mode.

The operation can occasionally be practiced by external manipulation alone, but it usually requires the combined internal and external method.

To perform the external manœuver, the woman should be placed on her back with her hips raised above the level of her head and shoulders, so as to place the long uterine axis more nearly in coincidence with a horizontal plane, and the knees elevated. The abdomen must be exposed, or covered only with some thin material. By abdominal palpation the two poles of the long fœtal diameter, namely, the pelvic and cephalic, are to be located, and the hands placed upon them. Operating then between pains, an attempt is made to push upwards the pelvic extremity, and to bring the head into the pelvic brim. During uterine action the only effort should be to maintain the advance obtained. The manœuver of external version may sometimes be aided by turning the woman upon the side towards which the head lies, but the position is unfavorable for manipulation.

After bringing the head into the brim, it may be retained by suitable pressure made with the hand, but better still, if the os be dilated, by the application of the forceps; or the membranes may be ruptured and the liquor amnii permitted to escape. What answer a very good purpose as aids to maintenance of the acquired presentations are pads applied to the sides of the abdomen, along the line of the fœtal prominence, held in place by a well-adjusted binder.

By the combined method, that is, by the simultaneous use of both external and internal manipulation, cephalic version is more easily performed. The method described and practiced by Braxton Hicks is probably the preferable one. He prefers the lateral decubitus, and uses the left hand when the patient is on the left side, and the right hand when she lies on the right side. We quote him as follows: "Introduce the left hand into the vagina as in podalic version; place the right hand on the outside of the abdomen in order to make out the position of the fœtus and the direction of the head and feet. Should the shoulder, for instance, present, then push it, with one or two fingers on the top, in the direction of the feet. At the same time pressure by the outer hand should be exerted upon the cephalic end of the child. This will bring down the head close to the os;

then let the head be received upon the tips of the inside fingers. The head will play like a ball between the hands, and can be placed in almost any part at will. * * * It is as well, if the breech will not rise to the fundus readily after the head is fairly in the os, to withdraw the hand from the vagina and with it press up the breech from the exterior."

Anesthesia is neither necessary, nor specially desirable in all



FIG. 262.—First stage of the Combined method.



FIG. 263.—Second stage of the Combined method.

cases, for the practice of version by the combined manipulation, and hence, in such cases, the woman can be made to assume a position which is often found to contribute to the successful practice of the operation, namely, that upon the knees and elbows.

PODALIC VERSION.—"The reasons why podalic version so rapidly displaced in public favor the ancient turning of the head," says Glison, "seem to be chiefly on account of its facility

of performance, and rapidity in the termination of labor, for it is often very difficult to seize, bring down and properly adjust, the round, slippery head, by the old method of introducing the hand into the womb. By the modern external and bipolar modes, especially the latter, the difficulty and danger are so much less, that turning by the head, in transverse presentations particularly, will become more popular. But where haste is necessary, in the latter presentation, as well as in all others adapted to turning, podalic version, and that, too, in the regular way of introducing the hand into the womb, must be resorted to."

The operation may be performed by external manipulation, by the combined method, or by the introduction of the hand and seizure of the feet.

Wigand, to whom we are mainly indebted for the introduction of the *external method,* considered it suitable only to transverse cases. It is practiced so like cephalic version by external manipulation, that it requires no special description.



FIG. 264.—Third stage of the Combined method.

Position of the Patient. — In practicing podalic version in any manner, the position generally recommended by American obstetricians is the dorsal. The patient should be so placed that her nates lie near the edge of the bed, with her feet resting on chairs, or held by assistants as in forceps delivery. The abdomen ought either to be uncovered, or have over it only a sheet, a light chemise, or a night dress. The physician should stand between his patient's feet with his face towards her.

The Combined External and Internal Method.—The position and presentation having been determined, and the bladder and rectum emptied, the operation is performed much as is that of

cephalic version, the two poles of the fœtal oval being pushed in opposite directions. The whole hand is never introduced into the uterus, but it may be necessary to pass it into the vagina, on account of the inability to reach and handle the presenting part. In some cases chloroform will be required. The prerequisites for success are: Sufficient dilatation of the cervix to permit the introduction of two fingers; a certain degree of fœtal mobility; and a clear comprehension of fœtal position and presentation. After rupture of the membranes and escape of the waters, the operation becomes difficult, or even impracticable.

Internal Podalic Version.—This form of version, first prac-

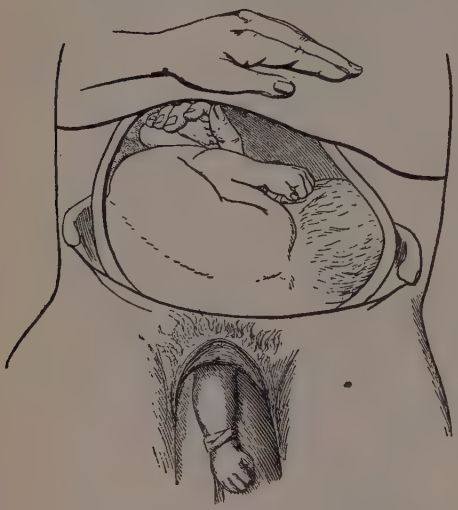


FIG. 265.—Internal Podalic Version, Arm presentation, dorso-anterior position.

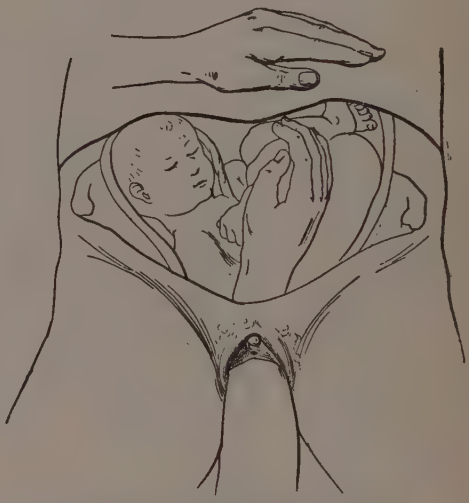
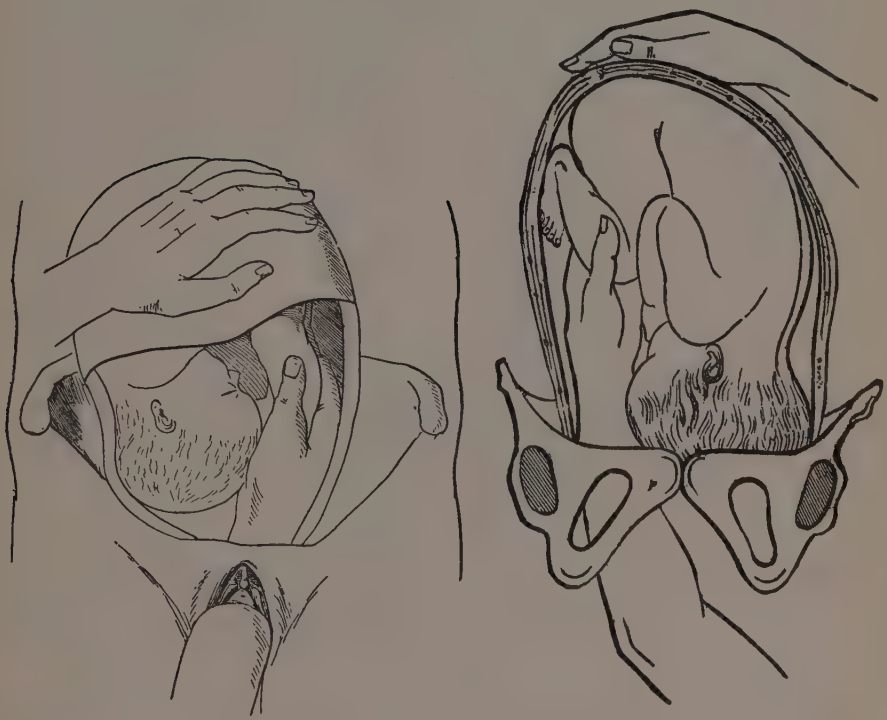


FIG. 266.—Internal Podalic Version, Transverse presentation, dorso-posterior position.

ticed by Ambrose Paré, consists in introducing the hand into the uterine cavity, seizing the feet and bringing them through the os uteri and vulva, while the body is made to rotate on its transverse axis. Sufficient dilatation is required to admit the hand without force, and, save in those cases where the utmost haste is demanded, the bi-polar, or combined method, should first be tried. Internal podalic version, while still the most popular mode of turning, is rapidly giving way to the other methods. It is the only practicable form of version when the liquor amnii has been long drained off, and a certain amount of uterine retraction has taken place.

After the preliminaries as regards diagnosis, position, and evacuation of the bladder and rectum have received attention, the woman should be drawn to the edge of the bed, and placed under anesthetic influence. The physician should take a position in front of his patient, with hand and bare forearm well lubricated, with the exception of the palm, and proceed gently to insinuate his hand, the fingers slowly separating and expanding the parts, until it finally lies within the uterine cavity. When



FIGS. 267 AND 268.—Internal Podalic Version in Cephalic presentation, with the fœtus in different positions.

practicable he should choose that hand, the palmar surface of which, as it passes, corresponds to the ventral surface of the fœtus; but in transverse presentations this is a matter of comparatively slight importance, as by turning the woman there is no possible direction within the pelvis or the womb in which either the right or the left hand may not be passed. If the physician is not ambidextrous, he should use his most efficient hand, without reference to the fœtal position.

In cephalic presentations the question of hands is one of more importance, and the weight of experience favors the use of that hand, the palmar surface of which corresponds to the ventral surface of the child; hence with the woman on her back, in first and fourth positions of the fœtus, the left hand should be used, and in second and third positions, the right.

After the hand passes the vulva, which it is enabled to do by firmly repressing the perineum, it should pause for a moment to examine more carefully the presentation and position. Then with the external hand upon the fundus uteri, the internal one should be most gently urged through the os and cervix uteri. If the membranes are now intact, it makes very little difference whether we tear them with the fingers and then push onwards through them, or pass the hand between the membranes and uterine walls until it comes into proximity to the feet, before breaking into the amniotic cavity.

If uterine action is at all forcible, the hand must be extended and remain passive until the contraction passes away; but if uterine efforts are feeble, and almost continuous, as they sometimes are, slow but resolute progress should be insisted upon.



FIG. 269.—Use of the Running Noose on the foot.

Obstetricians are at variance respecting the question of seizing one foot, or both feet, for the performance of version. The safe rule of practice is to grasp both feet or knees if they lie within convenient reach, especially if there be an urgent demand for delivery; but, if both limbs cannot be easily seized, the most accessible one ought to be brought down without unnecessary delay. If the demand for delivery be not pressing, and both feet be within reach, we believe it advisable to take but one, but to make ourselves sure that the one selected is the desirable one. There is a positive advantage derivable from bringing down but a single foot, or knee, since by leaving one still flexed upon the body, greater dilatation of the os uteri, the vagina and the vulva is necessitated by the passage of the pelvic portion of the fœtus, and the difficulties and dangers of head extraction are thereby diminished.

That there is a difference in desirability between the two legs, we are fully convinced, and the preferable one is that which lies

towards the abdominal parietes. The advantage in seizing this is found in the greater facility with which the fœtus rotates on its longitudinal axis, and so descends that the head will engage the pelvis with the occiput looking forwards. This advantage is clearly demonstrable on the manikin. Yet this is not a question of such practical importance as to demand much consideration.

In cases of turning where there is pelvic contraction, when extraction is likely to be difficult, it is regarded by some as

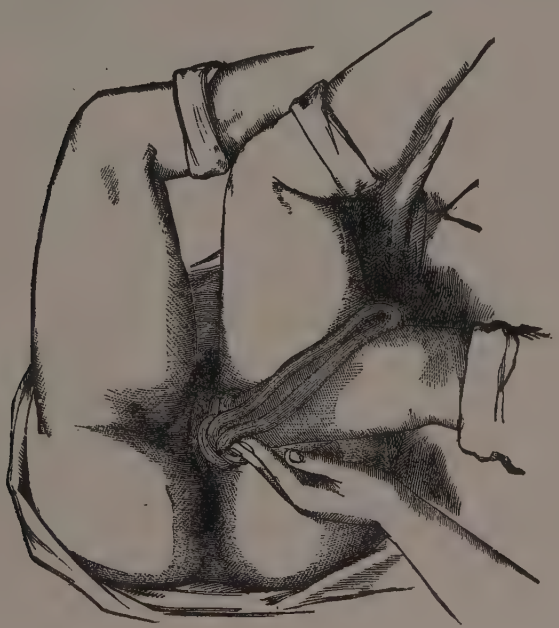


FIG. 270.—Turning by the Noose or Fillet.

highly advisable to bring down both legs; but the practical advantage of doing so, even there, is not obvious, since the rejected leg becomes free before the shoulders pass the vulva, and the special difficulty is in connection with extraction of the head.

Unless care be exercised, the elbow is liable to be mistaken for the knee, and the hand for the foot; but ordinary attention will prevent our falling into such an error.

While drawing down the foot, or feet, with the internal hand, an effort should be made to push upwards the head with the external. Before relaxing our hold on the feet we should

make sure that the version is complete, as otherwise the fœtus is liable to be spontaneously restored to its original position. If the head refuse to ascend, a running noose of gauze, or other suitable material, should be slipped around the foot, and traction made on it by one hand, while the fingers of the other are used within the os uteri to push the head upwards.

In some difficult cases of turning it is unwise to relax our hold of the foot for the purpose of putting a noose on it, since the incompleteness of version may cause it to retract beyond ready reach and thereby occasion much trouble. To apply the fillet while still retaining a hold of the foot it will be necessary to noose the former about the arm and gradually work it upwards until it reaches the foot.

If version cannot be completed with one foot, the other must be brought down.

When, in transverse presentations, the arm descends into the vagina, it somewhat embarrasses version, but does not prevent it. In such cases it is a good plan to place a noose of tape about the wrist, which enables the operator to control the arm, both while his hand passes into the uterine cavity, and later, during extraction of the trunk.

Completion of the Delivery.—After the desired change has been effected, the question arises whether labor should at once be completed, or be left to the natural efforts. If there exist no urgent demand for delivery, nature may be given a fair opportunity; but the woman is already anesthetized, and very likely the pains are in great measure arrested, so that, in general, it would seem most wise to proceed carefully to terminate the labor.

CHAPTER XX.

OBSTETRIC OPERATIONS—Continued.

The Forceps.—The obstetrical forceps were designed and used by one Paul Chamberlen in the early part of the seventeenth century. In 1647, Peter Chamberlen, in a little pamphlet published by him, speaks of a discovery made by his father, Paul Chamberlen, for saving the lives of children during labor. It, however, remained a family secret, bringing its possessor immense gain, and did not become public until 1733, in which year Dr. Chapman, in a brief treatise on obstetrics, said that "the secret mentioned by Dr. Chamberlen was the use of forceps, now well known to the principal men of the profession, both in town and country." In another edition of his work, published two years subsequently, he gave a cut of the instrument, which was afterwards known as Chapman's forceps.

Since that day this most useful obstetric instrument has undergone such change in form and applicability as to render it much more useful.

As at first designed, the forceps were intended for application to the head when lying in the pelvic cavity or at the outlet; though they were sometimes used at the brim. One change in the forceps was in the direction of augmented length, with the design to provide an instrument capable of grasping the head at the pelvic brim, or even above, and the result is that we now have the *long forceps* and the *short forceps*.

THE SHORT FORCEPS.—The short forceps owe their brevity chiefly to the abbreviation, or entire absence, of the shank, and the shortness of the handle: the fenestrated portion of the instrument not being materially less than the same part of the long forceps. The instrument is recommended mainly because of its easy portability, and the possibility, in some cases, of robbing the operation of forceps delivery in great measure of the formidable aspect, which, in the patient's eyes, it is so apt to assume. It is claimed by those who advocate frequent use of this instrument, that it can be applied even without the patient's knowledge. We know from experience that it is usually of easy application, but that it can be gotten on, while the woman is wholly conscious, without attracting her attention, we have not often found to be true.

Most patterns of short forceps possess the usual cephalic, but very little of the pelvic, curve, the latter not being required in low applications for which this instrument is intended.

THE LONG FORCEPS.—Since it has been found in practice that the long forceps may be applied, not only at the brim, and above it, but also in the pelvic cavity and at the outlet,—in fact, that they answer almost equally well the purposes of the short,—most of the instruments at present manufactured are of the long variety.

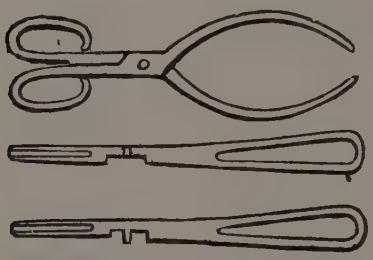


FIG. 271.—Chamberlen's Forceps.



FIG. 272.—Stone's short Forceps.

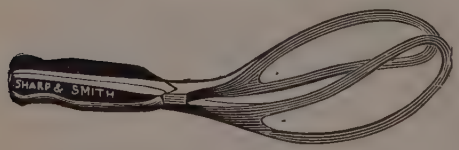


FIG. 273.—Knox's short Forceps.

Without commenting on the different patterns of forceps which we find in the instrument shops, we have become convinced, from use of many of them, that, while we cling to instruments of a certain form, our preferences may proceed largely from frequent use, for there are few of the more prominent varieties which are really objectionable. The features to be sought are handles of moderate length; blades as light as are compatible with great strength; a cephalic curve sufficiently acute to afford a hold on the head which will not slip, even when taken over its long diameter; and a pelvic curve acute enough to enable the point of the blades easily to clear the sacral promontory without requiring excessive depression of the shanks against the perineum.

THE SALIENT FEATURES OF THE INSTRUMENT.—The blade of the instrument is constructed with a *fenestra* varying in width, and slightly so in general shape. This part of the instrument requires to be strongly made, and none but the best quality of steel should be used in its construction.

In order to give the blade a firm hold of the head, it is provided with what is termed the *cephalic curve*. We believe with

Dr. Landis that, "with a proper head-curve the tips of the blades will approximate to such an extent, when the instrument is applied, that traction upon the blades brings their distal end upon the farther end of the head, so as to not only securely hold it, but also to push it onwards. When forceps are said to slip during their use, one of two things is certain; either the head-curve of the instrument is insufficient, or the blades have not been properly applied." He should have added, perhaps, "or traction is not made in the right direction."

The *pelvic curve* is a feature of the utmost importance. By means of it the forceps are more easily applied, and extraction is more easily effected.

Forceps are provided with a variety of handles. Hodge's and Comstock's, for example, have slim metal handles which terminate in blunt hooks; but most other patterns have

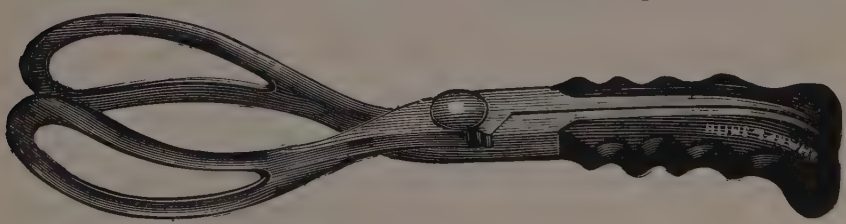


FIG. 274.—Reamy's Forceps.

wooden handles, provided at their distal extremities with shoulders or rings, upon or within which the fingers may rest in making traction. The wooden handles are far preferable.

AXIS-TRACTION FORCEPS.—Ever since the introduction into obstetrical practice of the long forceps, there has been a sensible need, in some cases, of an instrument of a form which would enable the operator to make traction in the line of the axis of the plane of the superior strait. The difficulty lies in the curve of the parturient canal, which, from brim to outlet, is considerable, as will readily be seen when we recollect that, in the erect position, the plane of the brim is at an angle of 60° with the horizon, and the plane of the outlet at an angle of 11°. But when we recollect also that the head of the fœtus does not come into the world on the plane of the outlet of the bony pelvis, which faces somewhat backwards, but on a plane, the posterior boundary of which is the posterior commissure of the vulva, and which looks almost directly forwards, we obtain a better idea of the extent of the curve of the parturient canal.

The long forceps, as ordinarily constructed, are provided with a curve to conform to the curve of the pelvic axis, and, therefore, when the instrument is applied to the head lying at the superior strait, or above, and traction made, a certain part of the force is dissipated, owing to our inability to make traction in the direct line of the pelvic axis. This effect is easily demonstrated on the manikin, or on the dry pelvis, and is well illustrated in Fig. 278.

To be sure, the difficulty presented in the majority of cases in which the forceps are used at the pelvic brim, or above it, is sufficiently well overcome by the long forceps as ordinarily constructed; but occasionally the brim is either so considerably diminished in its diameters, or the fœtal head so hard and so greatly augmented in volume, that only by dint of powerful traction, and the most expert management, can the labor be brought to a successful termination. It is in such cases, and perhaps also in some of those which the ordinary forceps cannot deliver, that the axis-traction instrument is peculiarly serviceable. With it the head can be drawn into the brim in a direct course, while with the other instruments it is drawn towards the symphysis pubis as well as in the direction of the pelvic outlet.

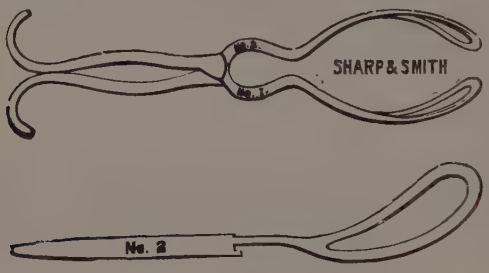


FIG. 275.—Comstock's Forceps.



FIG. 276.—Leavitt's Forceps.

With a view to overcome the difficulties of delivery attending cases like those to which we have referred, Tarnier's forceps have been provided, and can be made to serve a useful purpose. But the instrument is expensive, heavy, clumsy and extremely difficult of application save by experts.

Various other instruments have been devised to accomplish the same end, but in the forceps bearing the author's name are found all the essential elements combined in the form of an ordinary instrument. These forceps can be effectually, and with

equal facility, applied to the head in all situations, i. e., above the brim, at the brim, in the pelvic cavity and at the outlet. In



FIG. 277.—Tarnier's Axis-traction Forceps.

other words, they answer the purpose of any other instrument, while they also serve an exceptionally good purpose in difficult

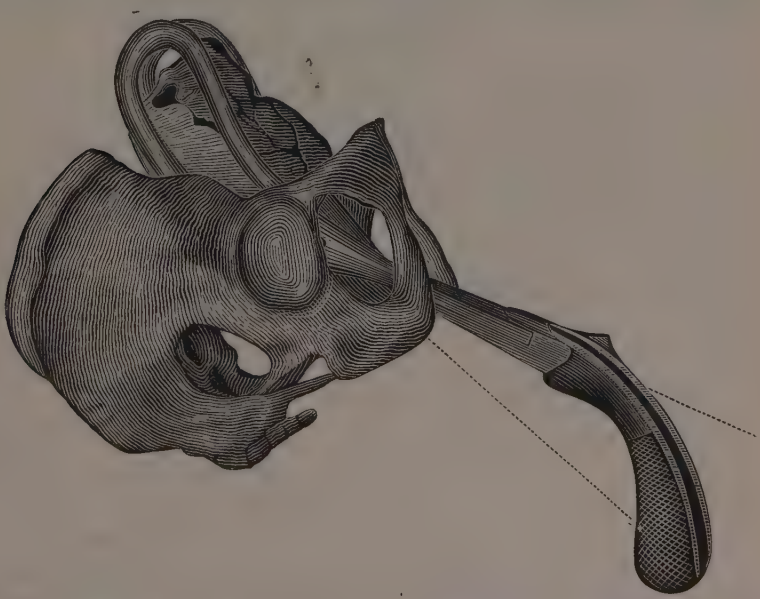


FIG. 278.—Leavitt's Forceps applied to the Head above the brim, showing how traction can be made in the axis of the plane of the pelvic brim.

cases at the brim, and above, by enabling us to make traction in the line of the pelvic inlet. We need only add that, in such cases, the weight of traction effort should be made near the extremity of the handle.

DESIGNATIONS OF THE BLADES.—In English text-books the blades are spoken of as the male and female, and the upper and lower. The latter designation has a double meaning, growing out of the position of the woman. In English practice the obstetric position is on the left side, and the lower blade, when locked with its mate, is not only beneath or behind the other, but is also in the lower side of the pelvis when applied. In America, the common, and most convenient designations, are the *right* and *left*. The right blade is naturally handled with the right hand, and usually goes more or less into the right side of

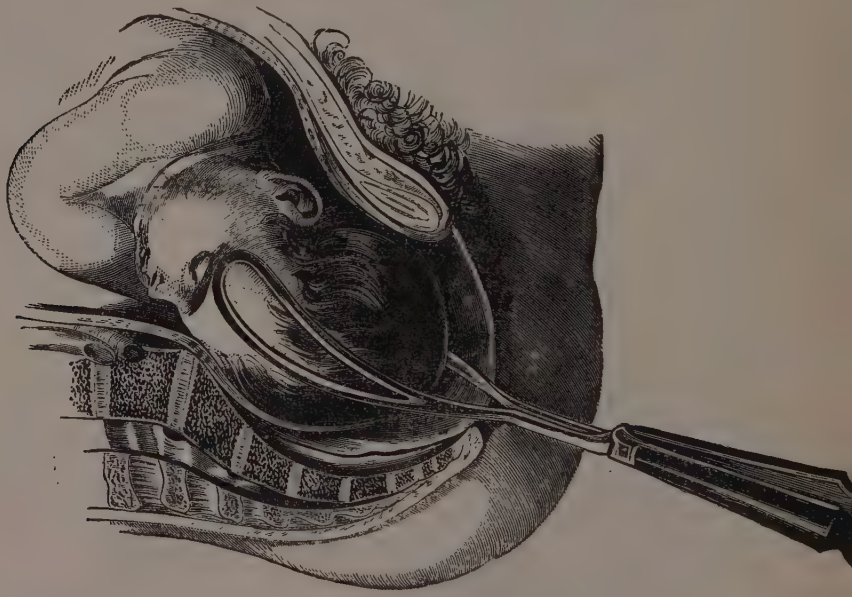


FIG. 279.—The Forceps at the Brim, by the Pelvic mode.

the pelvis; while the left blade is more conveniently handled with the left hand, and commonly goes more or less into the left side of the pelvis.

ACTION OF THE FORCEPS.—The forceps are primarily and essentially tractors. Their action is also, in a modified sense, that of levers and compressors. A certain amount of lateral oscillation gives greater power to the instrument, and if made without relaxation of traction efforts, and within moderate limits, it can do no harm. The antero-posterior, or "pump handle," movement is always to be avoided.

The compression force exercised by the forceps should be in direct ratio to the force of traction; the chief aim being

to retain firm hold. The degree of squeezing which the fœtal cranium will bear, when compression is made intermittingly and not too rapidly increased, is truly surprising.

MODES OF APPLICATION.—There are two modes of forceps application, namely, the *cephalic* or oblique, and the *pelvic* or direct. The former is used chiefly in the pelvic cavity, and at the outlet; while the latter is employed more especially at the pelvic brim and above it. The cephalic mode is always preferable, so far as fœtal interests are concerned; but, out of deference to maternal interests, it is not always advisable.

The Pelvic Application.—In adopting this we do not study the cranial position, and materially vary our application to suit it, but we pass the blades into the sides of the pelvis. Since this mode of application is used mainly in the high operations, and inasmuch as the fœtal head usually occupies an oblique pelvic diameter, the blades generally embrace the head over the brow, OR one side, and the mastoid process on the other. This form of application is adopted because of the difficulty and danger associated with adjustment of the blades to the sides of the head when at such a distance from the vulva, and at the farther end of the curved parturient canal.

The Cephalic Application.—In this we study the position of the fœtal head, and vary our application to suit it, the endeavor always being to apply the blades to the sides of the head.

CONDITIONS CALLING FOR THE FORCEPS.—"It would be an unprofitable undertaking," remarks Lusk, "to enumerate all the conditions which render forceps advisable. The indications for their use may be summed up in two general propositions. The forceps is applicable—(1) In cases where the ordinary forces operative during labor are insufficient to overcome the obstacles to delivery; (2) In cases where speedy delivery is demanded in the interest of either mother or child.

"Both these propositions are, however, subject to the limitation that, in the selection of the mode of delivery, choice should be made specially with reference to the maternal safety. Fortunately, in the great proportion of cases the interests of both mother and child are identical."

THE PRELIMINARIES.—When the operation has been decided upon, it is advisable in most cases to administer an anesthetic before in any way changing the patient's position. An anesthetic is not absolutely required, and some women object to it, preferring to suffer the necessary pain rather than take what

they regard as unnecessary risk. If the head lies in the cavity, or at the outlet, the pain attendant on forceps delivery is not sufficient to make the anesthetic a necessity, and it may be omitted. We would advise against partial anesthesia. Either let it be entirely omitted, or carried to the extent of complete narcosis. Administration of the anesthetic may be begun by the operator, and subsequently entrusted to an intelligent nurse, or other attendant, provided no skilled assistant is at hand.

It is assumed that the bowels and bladder have been recently evacuated.

The forceps should be thoroughly clean, and, for a short time before their use, should stand in a warm antiseptic solution. Meanwhile the membranes, if intact, should be ruptured, and the woman turned so that she will occupy the dorsal position, across the bed, with the hips well to the edge of it.

THE APPLICATION.—We have found but little practical difference in application of the forceps, between a high and a low head, except in the adoption of the pelvic mode in one case, and the cephalic in the other. A proper adjustment of the forceps in one case is almost as difficult as in the other. When the head lies low, it is within easy reach, but the difficulty is increased by adoption of the cephalic mode of application. When the head lies high, it is not so easily reached, but by the pelvic mode the forceps are made to go readily into place. The only exceptions to easy application which we have found, have been in instances of marked pelvic deformity, large cranium, small os uteri and impacted head.

The patient's feet resting on the edge of the bed, or placed in chairs and there held by assistants, the operator assumes his place directly in front of the woman, and, having lubricated the blades, takes the left one in his left hand, and introduces it until the point rests against the fœtal head, while he uses two or more fingers of the opposite hand, resting against the presenting surface, as a guide. The handle at this stage will form nearly a right angle with the maternal body, looking slightly to the woman's right. Now, remembering the double curve of the instrument, it is given a spiral sweep, the handle passing over the patient's right thigh, and then made to approach the median line, until, in a high application, the shank presses firmly on the perineum. A common mistake is that of attempting to carry the blade directly to its place without first

passing its point towards the sacral hollow, and then to its proper position by a broad spiral sweep. In applying the forceps to the sides of the head before cephalic rotation has taken place, the sweep of one blade will be but slight, while that of the other will be unusually great.

The application of the second blade is made in a similar manner, the instrument being held in the right hand, and guided by the left. In giving it the necessary sweep, the handle is made to pass over the woman's left thigh.



FIG. 280.—Introduction of the first Blade.

Both blades now being *in situ*, we ought to experience no difficulty in making them lock. If the adjustment be inaccurate the instrument should be gently manipulated, an endeavor being made to bring the blades directly opposite without the exercise of force. If necessary, one or both blades may be removed and reapplication made in order to effect our purpose.

TRACTION.—The forceps once on, and locked, it next becomes the operator's duty to effect delivery, and to do so safely re-

quires some knowledge concerning traction. The handles of the instrument should be held in a convenient way, and so as not to exert too great compression of the fœtal head. If the pains continue, traction efforts should be made coincidently with them; if they are absent, traction should substitute them. But we usually find, as soon as we begin to draw on the forceps, that the uterus is excited to action, and the *vis a fronte* is aided by a *vis a tergo*. Traction energy should at first be moderate, but afterwards increased if necessary to a high degree; but so long as the resistance is offered mainly by soft structures, as, for example, an incompletely dilated cervix, or vulva, the utmost caution must be exercised. Traction when the head is passing the vulva ought to be light, through fear of lacerating the perineum.

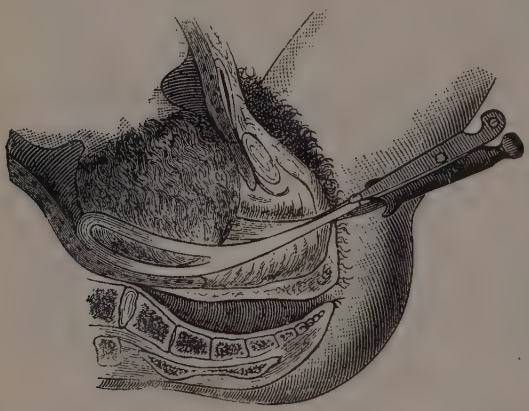


FIG. 281.—Imperfect seizure of the Head above the Brim, favoring slipping of the instrument.

The line of traction will be well enough indicated by the direction naturally taken by the handle in the intervals between pains. In high operations it is at first downwards, and possibly a little backwards; but as the head descends, it should be turned more and more forwards, until the handle at the final passage comes to form a right angle with the long axis of the woman's body.

REMOVAL OF THE FORCEPS.—When the head is embraced over the poles of its bi-parietal diameter there is no necessity for removal of the forceps until after complete delivery of the head; but when, from adoption of the pelvic mode of application, the head is held over its occipito-frontal, or over an oblique diameter, in performing rotation the blades will be carried into such positions as to endanger the perineum posteriorly, and the vestibule anteriorly; hence we regard careful removal of the instrument a wise precaution. Before doing so the head should be made to reach the crowning stage, and then, after removal, it can easily be delivered by Fasbender's manœuver, described

in another chapter, which consists in cranial delivery by means of the fingers in the rectum.

FORCEPS IN OCCIPITO-POSTERIOR POSITIONS.—We are told by Lusk that "so long as the occiput looks to the rear, it is the rule of midwifery practice to refrain from the use of forceps, which, of necessity, prevents forwar rotation taking place." Moreover, it is added: "As attempts to rotate the occiput around to the symphysis by instrumental means are rarely successful, it is advisable under such circumstances to apply the forceps directly to the sides of the child's head, and to imitate during delivery the mechanism of labor in occipito-posterior positions. If the sagittal suture occupy an oblique diameter, the forceps should be applied in the opposite oblique diameter. As

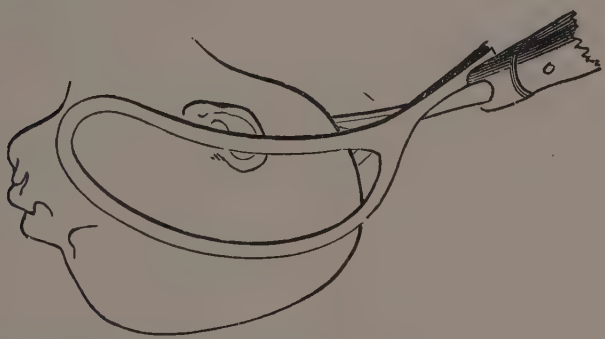


FIG. 282.—Showing how the Head is usually seized in the Cephalic mode of application.

the head descends, the occiput should be turned into the hollow of the sacrum."

We are convinced from experience that it is possible to do much better than this. Accordingly, when there exists a demand for the forceps above the brim, with the occiput looking more or less backwards, we regard it as the operator's duty to endeavor carefully to rotate the head, so that its long diameter will coincide with the transverse of the pelvis, before applying the instrument. By virtue of such a change he is enabled, with the forceps in the sides of the pelvis, to grasp the head in its long axis, and effectually prevent a backward movement of the occiput during delivery, and, if requisite, to enforce proper rotation. On the contrary, when the instrument is so applied without the observance of the precaution mentioned, the head is seized in one of its oblique diameters, as has already been

shown, and even slight compression during descent disposes the occiput to rotate into the hollow of the sacrum.

This change of position above the brim is so easily accomplished in suitable cases that explicit directions are not required. The sinciput, as felt in the hypogastrium, should be pressed backwards, whilst the occiput is drawn forwards with the fingers of the other hand in the vagina. Having effected an alteration, the acquired position should be maintained by firm and equable pressure in the supra-pubic space, until the forceps have been adjusted to the head. In default of so doing, the head is very liable to revert to its original position.

Observation has taught us that the head, when clearly above the brim, is not always freely movable, and then all prudent efforts to change its position will be utterly unavailing. To such cases, including as well those in which the head lies within the embrace of the superior strait, a different treatment is applicable. If the occiput is turned more or less forwards, or directly to one side, the physician has but to pass the blades according to the usual directions for the pelvic application; but if it is more or less backwards, then, instead of putting the blades squarely in the sides of the pelvis, let him, if possible, place them on the forehead and occiput (a thing, we confess, not always easily done), and thereby embrace the head over the poles of its long vertex diameter.

When once the instrument is fairly adjusted, if the head is found to be unfixed in the brim, it may be gently raised and carefully rotated from one oblique diameter into the other, but the operator should beware of violence. If such a movement prove impracticable, the head should be drawn, with usual precautions, to the pelvic floor, and then, if the natural efforts are ineffectual, the desirable evolution can easily be enforced.

The forceps are occasionally required in the situations described, but much oftener after the head has descended into the pelvic cavity. With respect to the mode of treatment best suited to the latter class of cases, a few years appear to have wrought a change in the opinion and practice of many excellent accoucheurs. The older authorities teach, and we believe with much force,—that, when the head lies in the pelvic cavity, the forceps should be applied in the diameter opposite to that occupied by the long cranial diameter, so that they will rest on the parietal eminences. Some later writers appear to prefer the pelvic mode of application even there, in adopting which the instrument will

sometimes go to the sides of the head, but usually not. When free to choose between the two methods we do not hesitate to adopt the cephalic, inasmuch as it is always much less dangerous to fœtal life and features.

In third and fourth positions of the vertex in the pelvic cavity, it is well to obtain our hold of the head, if possible, over the poles of the long vertex diameter, as we are then enabled nearly to finish the delivery before removing the blades. But in cases really demanding use of the forceps we frequently find this impossible, and are then driven to choose between an oblique and a lateral seizure of the head. In the latter case we ought always to prefer the cephalic mode, and carefully venture on forward rotation of the occiput. While there are many who denounce this procedure, we truly believe, after considerable experience of the practice of it, that it can be easily and safely adopted provided we pay strict attention to the pelvic anatomy, and the curves of the blades which we are using. Still, it may be safer for the unskilful operator to employ the pelvic mode, and terminate the labor with the occiput looking towards the perineum.

In enforcing forward rotation of the occiput with the ordinary forceps, a double application of the instrument is required. Owing to the pelvic curve of the instrument rotation can proceed only to a certain point before inversion of the instrument will begin, and this is a movement which greatly endangers the maternal tissues. It is inattention to this pelvic curve of the forceps which occasions the contusions and lacerations which some declare to be inseparable from the operation.

When rotation has been carried to the safety boundary, then the blades should be carefully removed, by reversing the movement of introduction, and reapplied, this time with the concavity of the pelvic curve addressed to the fœtal occiput. Rotation can then be completed and delivery safely effected.

These directions apply, of course, with equal force to the termination of an occipito-posterior application begun above the brim.

THE FORCEPS IN FACE PRESENTATIONS.—Application of the forceps to the face when it lies high in the pelvis is not permissible unless the chin is turned somewhat forwards, and the blades can be applied to the sides of the head. An application over the fronto-mental diameter of the face should never be made on a living child, as it means fœtal death, and therefore, when the

mental pole is not directed more or less forwards, the head lying at the brim, or above it if application to the sides of the head be impossible, the choice of operative resources, in case delivery is called for, should lie betwixt an attempt at conversion of the face into vertex presentation, and version.

In mento-lateral, or posterior, positions, with the head in the cavity, or at the outlet, we believe the forceps may be used if necessary, and forward rotation of the chin effected. In fine, if the case seriously threaten to persist with the chin to the sacrum, we believe it to be a conservative operation, for both mother and child, to apply the forceps, and, operating with extreme care, attempt to bring the part forwards. The author has so done in two cases, and that without harm. The instrument in that instance will require a double application, as in some cases of occipito-posterior positions. In the first application, the instrumental curve should look towards the forehead, and after rotation has been effected as far as the transverse diameter, the instrument should be removed, and reapplied with the curve directed towards the chin. Rotation is then to be slowly performed, during traction, and the chin brought to the pubic arch.

In mento-anterior positions no unusual danger attends the forceps when they are applied to the lateral surfaces of the head.

USE OF THE FORCEPS ON THE BREECH.—Breech presentations are generally aided, when aid appears to be required, by instruments constructed for the purpose, namely, the blunt hook and the fillet. By means of these, properly applied to the flexure of the thighs, considerable force may be exerted and delivery effected. But when we come to compare them, in all their essential features, with the ordinary obstetric forceps, and reflect upon the respective uses of each, we discover that the latter instrument is much better suited to a safe and easy delivery of the presenting head, than are the former instruments to a safe and easy delivery of the presenting breech. The fillet requires great effort and consummate skill for its application to a breech not within easy reach of the fingers; and the blunt hook, while easily applied, is extremely liable to do serious injury to the fœtal tissues.

The ordinary forceps, though designed for the head, may be effectually and safely applied to the breech. Forceps of a peculiar pattern have been constructed for this purpose; but the

common forceps (the short straight forceps being preferable, we believe), when adjusted to the sides of the fœtal pelvis, that is to say, over the poles of the transverse pelvic diameter, are equally harmless and efficacious.

The author has made this use of the forceps in at least a dozen cases, and is well satisfied with the results obtained.

From study, experience and reflection we have deduced the following conclusions:

1. That the forceps may generally be used in breech presentations to better advantage than any other instrument, and with less danger than the blunt hook.

2. As a preliminary to the operation, it is essential that the position be unmistakably recognized.

3. The blades, when on, should embrace the pelvis over the poles of its transverse diameter, as a much better hold is thereby acquired, and dangerous pressure with the points of the instrument by it averted.

THE FORCEPS TO THE AFTER-COMING HEAD.—This is an operation but seldom required, and it has been sufficiently described in another chapter.

CHAPTER XXI.

MINOR OBSTETRIC INSTRUMENTS AND OPERATIONS.

The Vectis.—The vectis, or lever, was devised by Roonhuysen, of Holland, about the time that the Chamberlens began to use the forceps in Great Britain. Roonhuysen handed down the secret to his sons and others, and it was eventually purchased by Drs. Visscher and Van den Poll, for 5,000 livres, and imparted to the profession. The instrument was long popular, but it has now fallen into comparative obscurity, not because of its intrinsic worthlessness, but because it is eclipsed by the forceps. By some prominent authors it is not even mentioned.

The vectis greatly resembles a single blade of the straight forceps. Several patterns of the instrument are in use, a cut

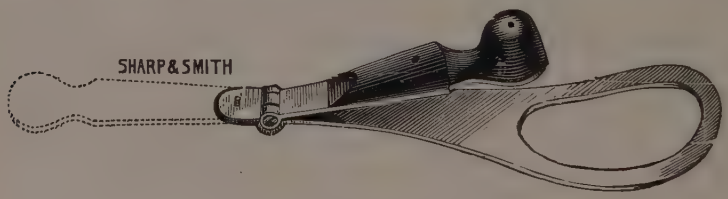


FIG. 283.—Folding Vectis.

of a very convenient one being shown in figure 283.

ITS USES.—We believe that this instrument may be used to advantage in a number of unfavorable conditions, and since its employment does not necessitate the formalities of the usual instrumental delivery, less objection will be offered, and cases attended with few outward indications of abnormality may be greatly facilitated, which would otherwise be permitted to drag. Furthermore, the difficulties attending its use are not so great as those associated with the forceps, and hence the ordinary practitioner with a lack of skill which deters him from using the forceps, will be more inclined to avail himself of its aid.

In many instances the forceps are said to be demanded when the difficulty and delay in labor has arisen from extension of the fœtal head. The vectis is peculiarly well suited to just such cases, and when, by its simple leverage and traction, extension is overcome, labor goes on apace. When, in occipito-posterior positions, rotation is not disposed to take place in the desirable direction, the vectis is capable of affording much assistance,

and by it the occiput may be brought forwards. This is true also of the chin in those most trying mento-posterior positions of face presentation.

The instrument acts as both lever and tractor. In exercising its leverage powers we should be extremely careful not to make any part of the pelvic structures its fulcrum. Without a fulcrum its leverage action cannot be displayed, but it must be supplied by one hand of the operator, while the other acts upon the power arm of the instrument. A certain amount of traction may be exerted by the instrument as it is pressed firmly against the fœtal head, but it is awkward and generally inefficient. Greater traction force can be applied when the fingers of the operator are made to take the place, though very imperfectly, of the second blade.

THE BLUNT HOOK.—This, like the vectis, is an ancient instrument, formerly much used for extracting the fœtus in breech presentation, and occasionally in cephalic presentation attended with delay in delivery of the shoulders. It is intended to be

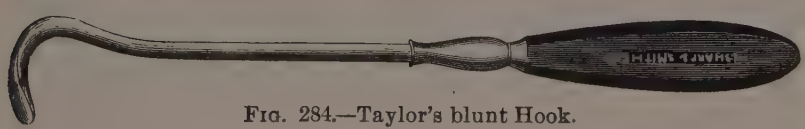


FIG. 284.—Taylor's blunt Hook.

hooked into the flexure of the thigh, or into the axilla, but it is so apt to injure the fœtal tissues that, for the extraction of a living fœtus, it has fallen largely into disuse.

Hypodermic Injections.—Though directions concerning the use of the hypodermic syringe do not properly belong to a treatise on midwifery, yet, since the employment of hypodermic medication, and especially the sub-cutaneous injection of ergot, is herein recommended for certain conditions, and furthermore, inasmuch as some of our homeopathic remedies act much better when so employed, we offer the following hints:

1. The best sites for puncture are the back of the arm, on a line with the insertion of the deltoid muscle, and the abdominal tissues near the umbilicus.

2. The needle should be passed deeply into the tissues, so that its point will penetrate at least half an inch beneath the integument.

3. The fluid should be slowly injected.

Catheterism.—This may be deemed scarcely worthy the title of an obstetric operation, and still in many cases its difficulties

are such as to try the skill of even those of extensive experience. The variety of catheters which is best suited to obstetrical practice in general is the soft rubber, both because of its facility of introduction and its freedom from danger. The gum elastic and silver catheters answer the purpose, but best of all is the glass.

MODE OF PERFORMANCE.—The catheter may be passed with a single hand, or with both. When both hands are used, the operator can stand by his patient's right side, and pass the fingers of his left hand between her thighs, as she lies with the limbs flexed, and locate the meatus, while with the opposite hand the point of the instrument is made to engage. Or he may stand between the woman's feet, as she lies on her back, and pass the index finger of the left hand into the vagina but a short distance, with its palmar surface looking upwards. Now if the finger is made to lie flatly against the anterior vaginal wall, it will rest on the urethra, while the meatus will lie close to the margin of the vagina, just within the vestibule. By remembering these points, introduction of the instrument will be greatly facilitated. With the soft rubber catheter now held in the other hand, between the thumb and forefinger, the point of it can easily be made to catch the meatus. If these instructions are followed, there is no occasion to attempt to locate the meatus with the point of the finger and thus render the effort more embarrassing and difficult.

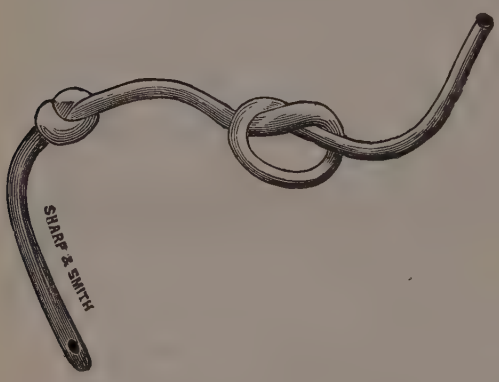


FIG. 285.—Soft rubber Catheter.

When a single hand is used, the catheter should be held as shown in Fig. 286, while the middle finger is made to rest just within the vaginal orifice, against its anterior margin, and the meatus will be found directly under the point of the catheter.

It should be remembered that *the meatus lies directly at the crown of the pubic arch,* and as the middle finger of the single hand, or the index finger in the double hand operation, are pressed against the urethra as it lies in the anterior vaginal

wall, they will easily feel the pubic arch, and thereby find further aid to introduction. Nor should it be forgotten that when the woman lies on her back, the catheter, in introduction, should be given a direction somewhat downwards and backwards.



FIG. 286.—Manner of holding the Catheter.

To perform catheterism skillfully requires considerable practice, but, above all, thorough acquaintance with the anatomy of the external generative organs, and the details of the operation.

To expose the parts, and locate the meatus with the eye, is a most indelicate and unnecessary proceeding.

CHAPTER XXII.

OPERATIONS INVOLVING DESTRUCTION OF THE FŒTUS.

Craniotomy.—Under the head of craniotomy are generally classed all the operations the performance of which involves mutilation of the head of the child. It is one of the oldest operations of midwifery, evidently having been practiced in the time of Hippocrates.

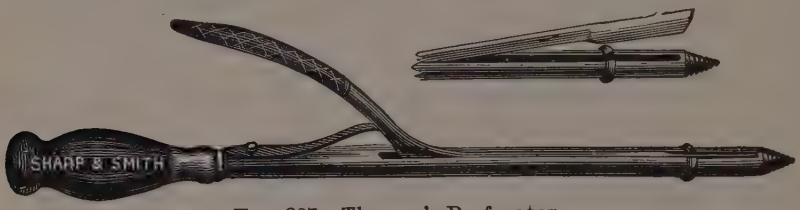


FIG. 287.—Thomas's Perforator.

ITS SPHERE.—Craniotomy is employed in those cases of difficult labor wherein neither the forceps nor turning can be effectually adopted. It is also occasionally had recourse to (though not always wisely) in certain contingent accidents which happen during parturition, as in some cases of accidental and unavoidable hemorrhage, in some cases of convulsions, in certain cases of uterine rupture, and in those cases of protracted labor in

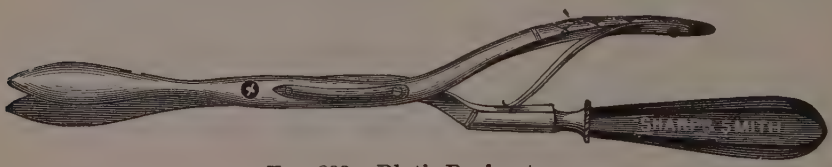


FIG. 288.—Blot's Perforator.

which, from the neglect or ignorance of the physician in attendance, the pelvic organs and tissues are brought into such a state from pressure, that delivery by other means would be extremely hazardous to the life of the woman. It is also employed in difficult labor, when there is positive evidence of fœtal death.

FREQUENCY OF EMPLOYMENT.—From the statistics which follow it will be seen that the frequency with which this operation is resorted to varies greatly among private practi-

tioners, hospital physicians, and the obstetricians of various countries. Dr. Collins reports that, during his mastership at the Dublin Lying-in Hospital, 16,414 women were delivered, during which time craniotomy was performed seventy-nine times. Dr. Joseph Clark reports that, in 10,387 cases of labor, craniotomy had been performed forty-nine times. According to Dr. Churchill's statistics, British practitioners resort to craniotomy once in 219 cases; the French, once in 1,205½ cases; the Ger-

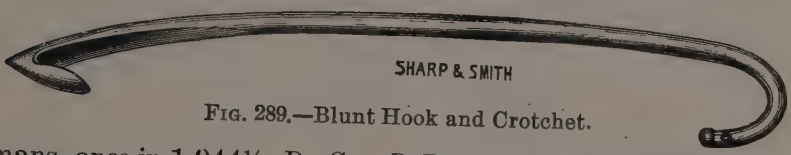


FIG. 289.—Blunt Hook and Crotchet.

mans, once in 1,944⅓. Dr. Geo. B. Peck's homeopathic statistics show that craniotomy is performed in one case out of every 879.

THE PERFORATOR.—There are many patterns of perforators, but those illustrated in the accompanying cuts are among the best. The instrument ought to be well made, straight and strong. It is the first instrument used in performing craniotomy, and, when properly constructed, can be employed without danger to the maternal tissues.

In two cases where we found ourselves far from home with no expectation of meeting such an emergency, we used a bistouri,

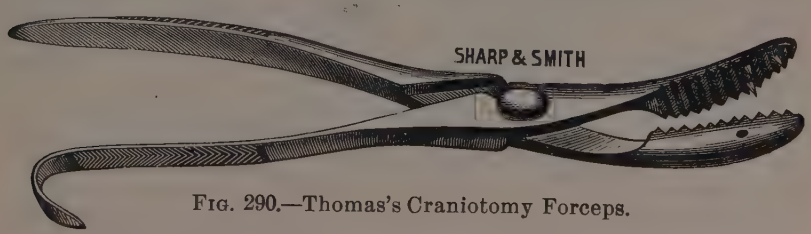


FIG. 290.—Thomas's Craniotomy Forceps.

wound for half its length, for protection from its cutting edge, as a perforator, and then broke up the brain with a syringe-tube and washed out the débris.

The possibility of mistaken identity in connection with perforation will be seen when we say that the sacral promontory has been pierced under the supposition that it was the fœtal head.

The Crotchet.—The crotchet is a hook, made of highly-tempered steel, possessing a sharp point, the design of which is fixation in some portion of the base of the skull, generally on its internal surface, by means of which traction may be made.

For many years it was the only instrument used as an extractor after perforation. It is powerful in the hands of a skillful operator, but a highly dangerous instrument when employed by the ignorant or inexperienced. All forms of the instrument are open to the serious objection of being liable to slip and wound either the maternal soft parts, or the hand of the operator, which should always be used as a guard. It has gone almost into disuse.

Craniotomy Forceps.—This instrument is used for both extractive and destructive purposes. It is intended to lay hold

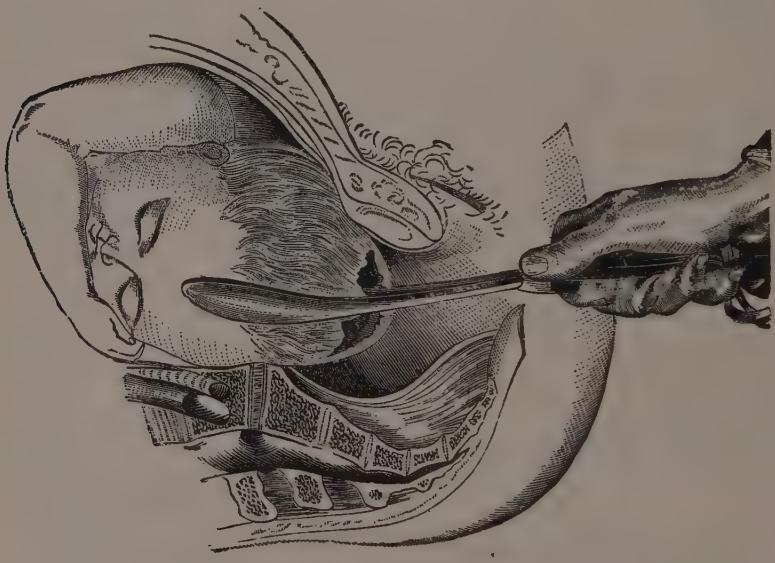


FIG. 291.—Use of the Craniotomy Forceps.

of the skull, one blade being passed within the cranium, and the other applied on the scalp. With the hold thus obtained, forcible traction can be made, and, save in cases of great pelvic contraction, delivery effected.

In some instances, however, it becomes necessary after perforation, not only to break up and wash out the brain substance, but also by these forceps to remove the cranial bones in fragments, before the bulk of the head is sufficiently reduced to enable it to be drawn through the pelvic canal.

The Cranioclast.—The cranioclast may be regarded as a pair of large craniotomy forceps, which admirably answer the purpose of delivery in many cases. The instrument designed by

Sir James Simpson is that most commonly employed in Great Britain. In America the cranioclast is not often used. It consists of two blades fastened by a button joint. The extremities are shaped like a duck-bill, and are sufficiently curved to give a firm hold of the head. The upper blade is provided with a deep groove into which the other sinks.

The female blade is applied outside the head, and the male blade is passed through the opening made by the perforator, and then the cranial bones are all separately crushed by the forcible grasp of the instrument. This having been done, the cranioclast is made to take a final hold, when it is turned upon its long axis several times, thereby twisting the scalp, and expelling more of its contents, after which extraction is easily effected.

The Cephalotribe.—In 1829, Baudelocque proposed a

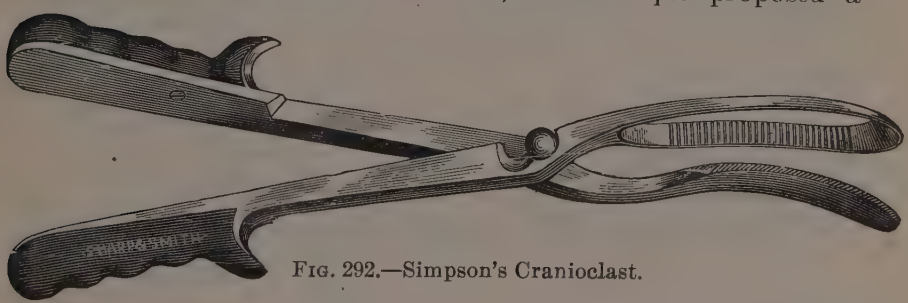


FIG. 292.—Simpson's Cranioclast.

cephalotribe for crushing the cranium in labors obstructed by pelvic distortion. It was used in France and on the Continent, but was not adopted in England and America till a much later period. It is a large and powerful instrument, intended to grasp the head, crush it, and then to extract it. The instrument, as commonly constructed, resembles a strong pair of obstetrical forceps. It is suited to pelves distorted by rickets, rather than malacosteon, and hence should receive special favor from American obstetricians. No rule can be given as to the amount of pelvic space required for its safe employment.

Perforation is generally recommended as a preliminary step, though Baudelocque regarded the preservation of the integrity of the scalp as one of the advantages of his method. The blades of the instrument are applied after the manner of the blades of the long forceps in a high operation. Like the ordinary forceps, the instrument may be applied through a partially dilated os uteri, when circumstances demand the operation under such

conditions. In order that the base of the skull may be reached, the blades should be deeply inserted. When the blades are *in situ,* compression is gradually applied by means of a screw. As the diameters of the head are diminished in one direction they are increased in another, but, except in instances of excessive pelvic contraction, this is a matter of no great importance.

If necessary the instrument may be carefully removed and applied so as to compress the head in its opposite diameter. Pajot claimed to be able to deliver through pelves contracted below two and one-half inches by thus crushing the head in different directions.

Before beginning extraction, the aperture made by the perforator should be examined to see that there are no projecting speculæ of bone.

Owing to the exceeding difficulty of making the cephalotribe

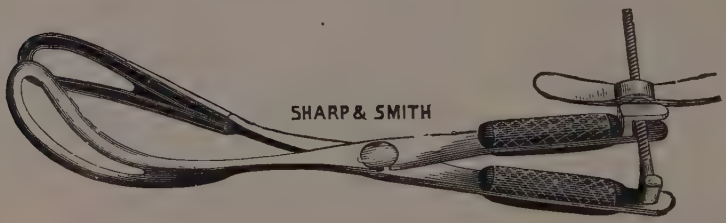


FIG. 293.—Lusk's Cephalotribe.

embrace the head in such a way above the superior strait as to enable the operator to crush the base of the skull, Tarnier has designed what is known as the basiotribe, which is practically a modified cephalotribe, or rather a combination of that instrument and the cranioclast. One blade of the instrument acts as a perforator, by means of which the base of the skull is reached and the necessary hold obtained.

With this instrument the involved diameters of the fœtal cranium can be reduced nearly fifty per cent.

RELATIVE VALUE OF THE DIFFERENT METHODS OF REDUCING CEPHALIC DIMENSIONS.—In those cases wherein reduction of the child's head is a manifest necessity, perforation may be practiced and delivery then effected by means of the obstetric forceps. Should this instrument fail, delivery may be accomplished by means of version, the craniotomy forceps, the cranioclast or the cephalotribe.

In suitable cases there is strong indication for the practice

of podalic version, before perforation, as a ready means of delivery. The advantages of this method are—

1. The base of the cranium is more easily destroyed.
2. The head is firmly fixed during perforation.
3. The position of the head can be varied so that the cephalotribe may be applied over different diameters.
4. The head having been crushed, the necessary traction is more easily applied upon the body and jaw of the fœtus, and with less danger to the maternal structures.

The relative merits of the cephalotribe and the cranioclast, as instruments with which to bring a mutilated child through a distorted pelvis, are not fully settled, but there appears to be no doubt that the cranioclast enables us to extend the limits of safe delivery far beyond what would be admissible with the cephalotribe, as by means of it we may, after partial or complete removal of the flat bones of the cranium, tilt the chin downwards, and draw the base of the head edgewise through the conjugate diameter of the pelvis.

It would be manifestly unfair to make a comparison between the Cæsarean section, Porro's operation and craniotomy in general, since these laparotomy operations are not to be thought of save in those instances wherein craniotomy itself is unusually difficult and dangerous. Through a pelvic conjugate contracted to two, or even two and a half, inches, craniotomy is attended with great danger and high mortality. Harris' latest tables show 153 Sänger-Leopold operations with a mortality of twenty-nine per cent., and 250 Cæsarean operations with a mortality of forty-six per cent. The percentage of deaths from the latter operation, however, during 1885–6–7–8 was only nineteen.

Of 103 cases of craniotomy coming under the observation of Rokitansky, forty-one proved fatal. Under present antiseptic methods this mortality has been somewhat reduced, and yet the unfavorable results, in greatly contracted pelves, are sadly against the operation.

Embryotomy.—This consists in mutilation of the fœtus, with a view to reducing its bulk, in order to facilitate delivery. It may very properly include craniotomy, but, as it is not usually made to do so, we shall here follow the common division.

DECAPITATION.—This operation consists in severing the head from the body, having done which, the latter can easily be withdrawn by means of the arm, and subsequently the severed part

extracted. This is the operation to be preferred, in bad cases of impacted shoulder, if the neck can be reached without much difficulty. Many instruments have been devised for effecting

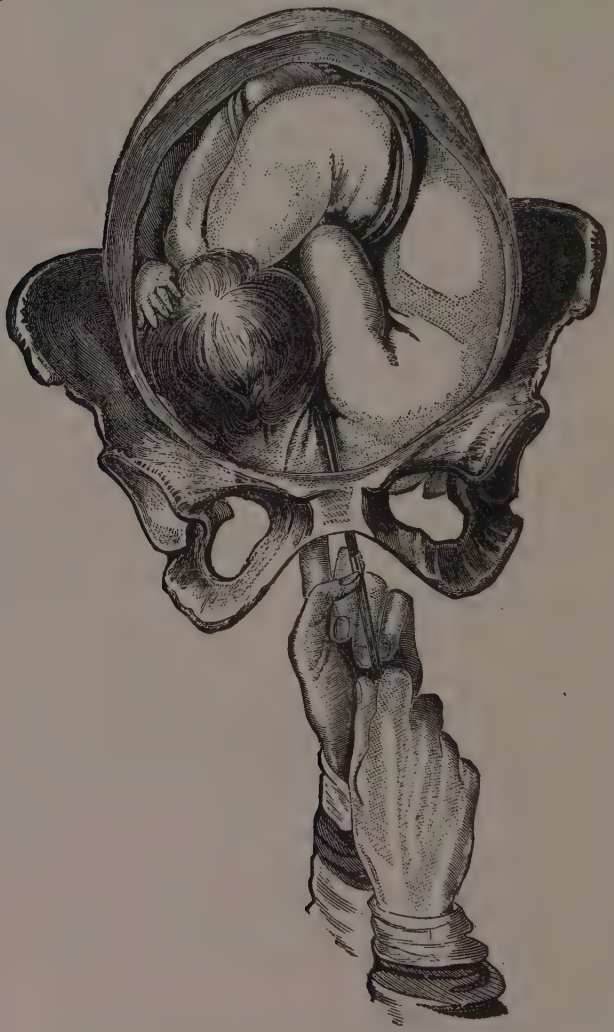


FIG. 294.—Mode of using the Decapitating Hook.

the purpose, but what is known as Ramsbotham's decapitating hook has met with much favor. To use the instrument it is slipped over the neck, and the part divided by a sawing motion. The most difficult part of the operation consists in getting the hook over the neck. To obviate this difficulty,

some have recommended the use of a spring, with a string, which may be more easily passed. By the same means, or by a

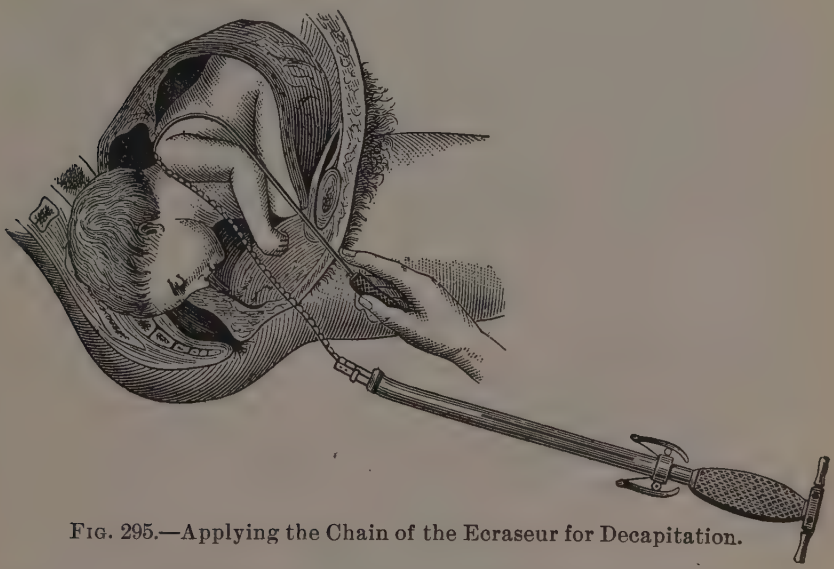


FIG. 295.—Applying the Chain of the Ecraseur for Decapitation.

stiff male catheter, the chain of an écraseur may be drawn over, and the head thus severed.

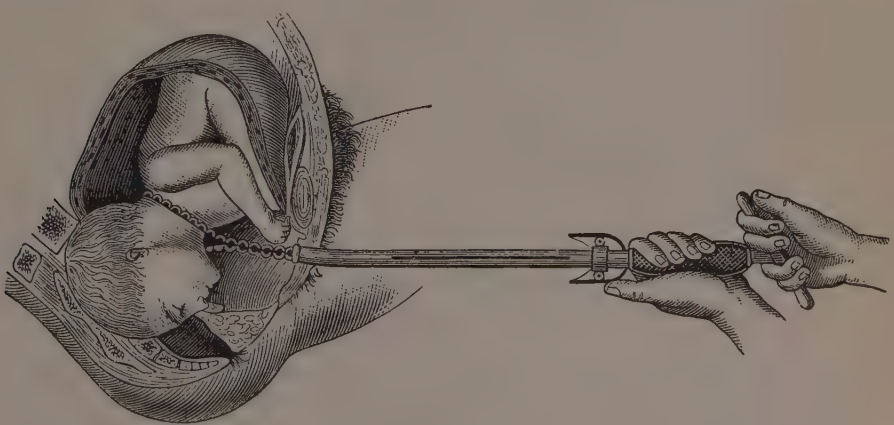


FIG. 296.—Decapitation of the Fœtus with the Ecraseur.

In an emergency a strong pair of scissors may be made to pierce the neck and finally to sever it.

The trunk is usually delivered without much difficulty. In most cases demanding decapitation the arm is prolapsed, and a

ready means for extraction afforded. Safe removal of the head may not prove so easy. It should be made to enter the pelvic canal in such a way that the exposed cervical vertebræ will not lacerate the maternal tissues. Delivery will usually be accomplished by means of the forceps, the head being steadied at the brim, with the hand applied to the abdomen, while the blades are being adjusted. Firm compression reduces the cranial bulk by expressing the brain matter through the vertebral canal. Some prefer the cephalotribe, especially when there is much reduction of the pelvic diameters.

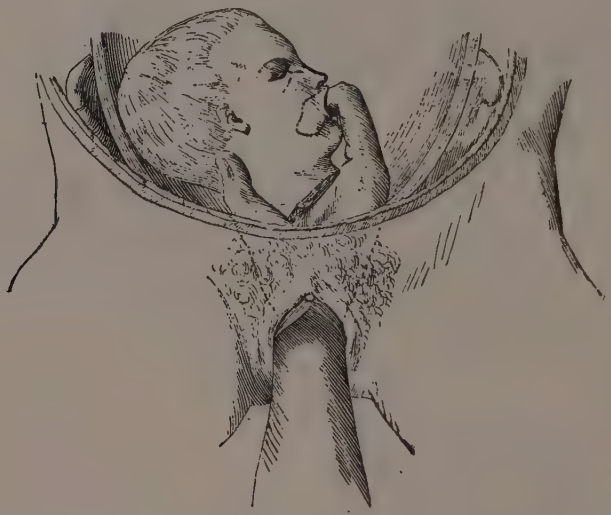


FIG. 297.—Manual delivery of the Head after Decapitation.

In case of extreme pelvic deformity it may be found necessary to perforate the head and pulpify the brain in order still farther to reduce its bulk.

Evisceration.—Our choice should rest upon the operation, in bad cases of transverse presentation, only when decapitation cannot be practiced. In executing it the thorax is perforated at its most accessible point, and the opening made as large as possible, in order that the viscera may be removed, and the fœtal bulk thus decreased. The perforator is swept about within the cavities, and the organs are thus broken up as much as possible, preparatory to their removal in fragments. The thoracic and abdominal cavities thus being opened, and to a great extent evacuated, the fœtus should be

made to perform an evolution, by means of which its pelvic extremity shall descend, and delivery thus be effected. Such a movement may be facilitated by division of the spinal column between the vertebræ by means of a stout pair of scissors, or even a knife carefully used, and then by traction with the crotchet, fastened internally on the pelvic bones.

A number of cases have been recorded wherein neither decapitation nor evisceration could be successfully performed, and the operator was driven to the performance of the Cæsarean operation.

CHAPTER XXIII.

OBSTETRIC LAPAROTOMY, LAPARO-ELYTROTOMY AND SYMPHYSEOTOMY.

Gastro-hysterotomy, or the Cæsarean Section, consists of abdominal and uterine incision with removal of the fœtus through the openings thus made.

The post-mortem operation was performed at a very remote period of antiquity; but hysterotomy on a living woman was first practiced about four centuries ago. It subsequently became so common that a Dominican friar of the sixteenth century, Scipia Merunia, was led to declare that it was practiced as frequently in France as blood-letting in Italy.

This operation, which is regarded as one of the most formidable in the whole field of surgery, is an elective operation in those cases wherein the pelvic diameters are so obstructed or contracted as to render delivery *per vias naturales* more dangerous or absolutely impossible.

The actual amount of contraction which calls for the operation is not agreed upon by obstetricians, and it goes without saying that other factors besides the mere degree of pelvic contraction enter into the calculation, as, for example, the skill of the operator and the facilities for the operation at command. Some competent obstetricians have deliberately rejected Cæsarean section when the pelvic conjugate measured only one and a half inches, while others have regarded it wise to resort to the operation when the same diameter measured two and a half inches.

The causes of death after the operation are hemorrhage, peritonitis, metritis, shock, septicæmia and exhaustion, being substantially those associated with hysterectomy.

With the operation in general, America has furnished the best results; while with the improved, or Sänger-Leopold, operation, Germany has shown the best record.

THE OPERATION.—The following most lucid account of the various steps of this comparatively infrequent operation is taken from Greig Smith's excellent work on Abdominal Surgery.

"When it has been decided, in any given case, that puerperal hysterotomy is to be performed, the sooner it is carried out the better. The condition of the patient, already, in all proba-

bility, not very favorable, rapidly deteriorates; and the local effects of prolonged contraction of the uterine fibre, exhausting its vitality, are not conducive to subsequent healing. Therefore, though it is advisable to operate with a cleansed vagina, no time which delays operation is to be spent in doing this. Cleansing may be carried out after operation is over. The abdomen may be readily purified with carbolic or corrosive sublimate lotion, and particular attention must be paid to the umbilicus. Shaving adds to the security. The general arrangements for operation are the same as those already described for abdominal operations in general.

"I should always use antiseptics in their fullest details. The instruments required are very few and simple. A scalpel, a pair of scissors, and a dozen pairs of locking forceps, with the necessary complement of needles, sutures, ligatures, and sponges, are all that are wanted. Two long flat sponges will be found very useful. In every case we ought to be provided with a clamp and other instruments necessary for a possible hysterectomy.

"*The Parietal Incision.*—The abdominal opening, which used to be made to one side of the median line, is now always made along it, and in the same manner as for ovariotomy. But the primary incision is longer, and does not descend so low, while it rises higher. The elevation of the bladder renders it inadvisable to approach within a distance of two or two and a half inches from the pubes. Above this point an incision of five inches may be made. According to the size of the patient, the upper limit will reach to, or pass a varying distance beyond, the umbilicus. According to Sänger, a suitable incision will in most cases be one-third of its length above the umbilicus, and two-thirds below it. The cut may go straight through the umbilicus; but, for reasons given elsewhere, I think it is better that it should pass to the left of it. If, as some surgeons recommend, the uterus is to be turned out of the wound before opening it, then the incision must be made considerably longer. More will be said on this proceeding. The intention, in the operation to be described, is to give sufficient space—firstly, for removal of the child; and secondly, for suturing the wound in the uterus.

"*Opening the Uterus, Extraction of Fœtus.*—In making the wound in the uterine walls, we have to bear in mind avoidance of hemorrhage and the encouragement of subsequent union. If

the incision is carried too low, the branches of the uterine artery are endangered. The anterior reflexion of the peritoneum from the uterus is a good guide. Here the peritoneum is loosely attached and somewhat freely movable. The lower limit of the incision may enter this region. So far as bleeding is concerned, the upper limits of the incision are unimportant. The position of the placenta might be supposed to have an important influence on the selection of the line for the uterine wound, but, practically, this would seem not to be so. Still, if it is possible to make out the site of the attachment of the placenta before incising the uterus (always difficult, often impossible, according to most writers), the operation might be rendered easier by avoiding this area. No extraordinary trouble need be taken to avoid it, however. A vertical incision is recommended.

"The line of incision being fixed upon, two long flat sponges are placed, one on each side of it, between the uterus and the parietes. An assistant, standing on the left side of the patient, opposite to the surgeon, places a hand deeply into each flank behind the uterus, and makes the uterus bulge forwards into the parietal opening, firmly holding it there. By this manœuver, and with the intervention of the flat sponges, the risks of escape of fluids into the abdomen are minimized. The uterus is so placed and fixed that the incision through its walls will correspond to the parietal incision.

"As to the best mode of making the uterine incision, many opinions are held. Some recommend tearing; others, a combination of cutting and tearing; others, pure cutting. Some recommend a dissection deliberately carried out, each vessel being caught in forceps as it bleeds. To prevent bleeding, the placing of a temporary ligature around the neck of the uterus has been used by several surgeons; by others, equally trustworthy, it has been neglected. As a matter of fact, the bleeding is rarely severe; but should it chance to be alarming, a sponge may be packed into the wound to check it while the elastic ligature is slipped over the uterus to its neck and tightened. In the absence of a proper tourniquet, a simple knot may be cast and tightened; while it can easily be prevented from becoming undone by placing a catch forceps upon it. In every case it is best to do without the use of a constricting ligature, if that is possible; every increase of traumatism adds to the danger.

"I am in favor of a clean-cut incision. At the upper end of the projected incision, where the uterus is least vascular, an

opening an inch in length is rapidly made by the scalpel. The opening need not completely perforate the uterine walls, but may be completed by pushing the finger through it. If the membranes are intact, a condition which is considered favorable, they need not now be divided; but it can matter little if they are divided by the finger. The incision is now rapidly completed downwards, by scissors cutting on the finger as a director. A few seconds suffice for this part of the proceeding. The scissors is now thrown aside, and the hand plunged through the opening catches the head of the child, the fingers clipping the neck. If



FIG. 298.—Delivery of Child.

the feet are conveniently near, the child may be extracted by grasping them; but as the uterine opening may contract round the following neck, it is better to extract by the head. If, during extraction by the feet, the head is caught in the uterine opening, the incision should be prolonged upwards to prevent downward laceration of the uterine walls.

"Uterine action will have been going on all this time, and gushes of amniotic fluid will have escaped from the uterus and run over the macintosh plastered round the abdominal opening. The assistant, meanwhile, will have carefully kept the uterus pressed forwards onto the abdominal walls: if he is skilled and attentive, no fluids will enter the abdomen.

"The umbilical cord is now divided between two pairs of locking forceps, and the child is handed over to an assistant. The surgeon then directs his attention to the detachment of the placenta, and the bleeding in the uterine wound.

"If the uterus is contracting well, bleeding from the uterine sinuses soon ceases, and the placenta becomes spontaneously detached. At least one surgeon seems to have been able to increase the vigor of uterine contraction by the application of electricity, and this hint is well worthy of attention. A hypodermic injection of ergotine is advisable at this stage. If the condition of the patient permits of it, it is always best to wait for spontaneous detachment of the placenta. During this period it is easy enough to control bleeding from the uterine

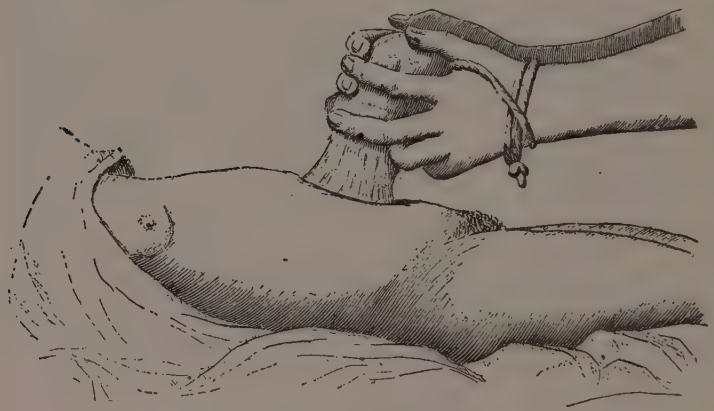


FIG. 299.—Removal of Secundines.

sinuses by compression by sponges, or, if necessary, by forceps. If, after a timely delay, the placenta is not detached, we may encourage detachment with the fingers; but if the uterus still refuses to contract, and if bleeding continues free from the uterine incision, then we ought to proceed to hysterectomy by Porro's method. The secret of success in simple hysterotomy is efficient contraction of the uterus; if this fails us, the next best proceeding is hysterectomy.

"In the great majority of cases, operated upon sufficiently early, the uterus contracts, the placenta is spontaneously detached, and the hemorrhage from the uterine sinuses spontaneously ceases, or becomes unimportant. Careful attention is bestowed on the complete and thorough removal of the secundines. When the uterus is empty, it may be advisable to

push a drainage tube or probang through the cervix and vagina, and leave it there to act as a drain. In any case, permeability towards the vagina will have been ascertained before closure of the uterine wound is begun. There is little use in mopping out the uterine cavity; it soon refills. Generally speaking, the less manipulation the better: the process of parturition physiologically looks after itself; meddlesome interference means, in many cases, harmful traumatism.

"If the uterus has contracted well, and seems to be small enough easily to be pushed by the assistant through the parietal opening, there is no strong objection to this being done. It prevents the escape of blood into the cavity during the extraction of the placenta, and facilitates the insertion of sutures. Most surgeons would, however dread the risks from additional traumatism thus induced.

"*Closure of the Uterine Wound.*—There is a very general consensus of opinion that on this detail, more than on any other, depends the success of Cæsarean section. No doubt this is so. But many cases of recovery are on record in which no closure has been attempted; the wound has been left to close by uterine contraction. On the other hand, it would seem that if uterine contraction fails, mere suturing is not always sufficient. Accurate suturing, *plus* uterine contraction, give the best results.

"The problem is complicated. The natural involution of the uterus induces an atrophy of uterine fibres, which is degenerative and attended with the free discharge of fluids. This process is, in wounds of uterine tissue proper, strongly prejudicial to union by adhesive inflammation. Uterine contractions going on after delivery, mean that a condition of unrest exists in the uterine wound. This is another bar to union. And this unrest and the delayed union permit of the escape of intra-uterine fluids through the wound into the peritoneum—a contingency which is full of danger.

"The methods of suturing the uterine wound are very numerous. Lebas, in 1769, first introduced sutures. Polin, of Kentucky, in 1852, first introduced the silver suture; and this has always been a favorite material. Hemp, catgut, silk, and other materials, have been used; and the sutures have been placed in a great number of ways—deep, superficial, continuous, interrupted, singly, and in combinations. Wells, in a successful case, used a continuous silk suture, one end of which he carried

through the vagina, subsequently removing it by traction. But the success after any method was not encouraging.

"Within the past few years special attention has been devoted by several German surgeons to the mode of suturing the uterine wound, and with a success which is remarkable and striking. The extraordinary capacity of serous surfaces to become quickly glued together by inflammatory adhesions had been fully proved in abdominal surgery. In gastrostomy, enterotomy, and enterectomy, it had been shown that apposition of serous surfaces, with fixation by suitable and numerous sutures, was followed by agglutination so intimate and strong that escape of fluids or gases was impossible. The danger in Cæsarean section arose from gaping of the uterine wound, which took place from the natural shrinkage of the uterine fibre. As the fibres shrank the sutures became loose; and they might even act as setons, encouraging the escape of uterine secretions. The principle of the new improvement was, to look to the peritoneum for the perfect closure of the uterine wound towards the abdomen.



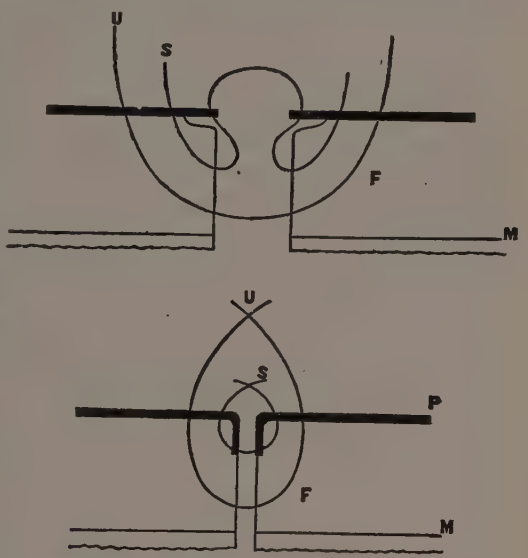
FIG. 300.—Uterine Incision closed by deep and superficial Sutures.

"Though Van Aubel is said to have suggested this method in 1862, Sänger, who published his ideas in 1882,* deserves the chief merit of having introduced it. Leopold was the first actually to carry it out. Beumer, Obermann, Münster, Credé, and others soon followed; and the combined results of these operators, in the short time during which they have been working, have already placed the improved mode of Cæsarean section by the conservative Sänger or Sänger-Leopold method ahead of all others.

"Many variations in detail have been given. Sänger at first recommended resection of a wedge-shaped strip of muscular fibre under the peritoneal covering, so as to permit of the infolding of a greater amount of serous surface. This was found to be unnecessary, and sometimes even harmful. It is usually possible, without resection of muscular tissue, to fold inwards sufficient breadth of serous surface. It is unnecessary to recapitulate every variety of suture which has been employed; I select one which seems the best.

* *Der Kaiserschnitt*, etc., Leipzig, 1882.

"A double row of sutures is used, deep and superficial. (Fig. 300.) The peritoneal covering is detached from the muscular fibre for a little distance along the margins of the wound: in this way it is possible to turn inwards a greater surface of peritoneum. Then the deep sutures are placed. They are made to enter at about half an inch from the edge of the wound, passed obliquely through uterine tissue, and made to emerge near to the bottom of the cut surface. No suture should enter the uterine cavity. These deep sutures should be placed about three-quarters of an inch apart; and they should be carried, converging a little, beyond the ends of the incision.



FIGS. 301 AND 302.—Diagrams to show the placing of Sutures in the Uterine Wound after Cæsarean Section. *P*, peritoneum. *F*, uterine fibre. *M*, mucous or decidual layer. *U*, deep uterine suture. *S*, superficial serous suture.

"Then the superficial sutures are placed, two between each deep suture. The needle first pierces peritoneum and muscle, coming out a little below the lip of the wound; then it picks up the free edge of the peritoneum on its own side, and finally pursues the same course in opposite direction with the other side. The diagram, after Sänger, shows this more clearly than any description. The sutures are placed with great care, and they are carried a little way beyond the extremities of the wound.

"The superficial sutures are first tied, bringing into accurate apposition two strips of peritoneum. Then the deep sutures are tied, causing still further incurvation of serous surfaces, and closing up and strengthening the whole. Finally, if apposition does not seem to be perfect, a simple continuous suture may be inserted over the whole.

"In every case where future pregnancies may take place this

should be prevented by excising with scissors a small portion of each Fallopian tube.

"While the sutures are being inserted, a few sponges placed in Douglas's pouch and around the uterus will absorb any fluids that may have escaped. These are now removed, and the whole cavity cleansed.

"The wound in the parietes is sutured in the ordinary manner

"The question of drainage is not without importance. In most cases it will be useless; but in some, by giving timely warning of the escape of uterine fluids, it may prove invaluable. At the worst it is harmless, and, therefore, I should always insert a drainage tube. It need not go deeply into the pelvis. A piece of rubber tubing, cut obliquely, laid over the uterine wound, and fixed by a stitch into the lower angle of the parietal incision, will suffice. At the end of a day or two it may be removed, should it not be required.

"If the patient survives the shock of the operation, the chief subsequent danger is from peritonitis. This is treated according to ordinary principles by turpentine enemas and saline purges. But such peritonitis will almost certainly have been produced by extravasation of uterine secretions, and for this the best treatment is free drainage and frequent irrigation. At the same time cleansing of the vagina and of the cavity of the uterus by warm antiseptic fluids must be instituted. If there is evidence of gaping of the uterine wound, the abdominal incision may be reopened, and an attempt made to close it. If the patient will bear it, hysterectomy, even, might be contemplated as a last resource."

AFTER-CARE OF THE PATIENT.—The care of the patient after the operation differs in no essentials from that prescribed for laparotomy in general.

POST-MORTEM CÆSAREAN SECTION.—The Cæsarean operation will also be advisable in those cases wherein women meet with sudden death during pregnancy or labor, and a living child is left in utero. There can be no reasonable doubt that many children have thus been saved who would otherwise have perished. The percentage of success in these cases, however, is not so large as we might be led to expect. Schwartz collected 107 cases, out of which number not one child was saved. These, however, do not truly represent the chances which the operation gives the child, for Duer has tabulated fifty-five cases, out

of which number forty resulted in the delivery of living children. The lapse of time between the maternal death and the fœtal extraction was as follows: "Between 1 and 5 minutes, including 'immediately,' and 'in a few minutes,' there were 21 cases; between 5 and 10 minutes, none; between 10 and 15 minutes, 13 cases; between 15 and 23 minutes, 2 cases; after 1 hour, 2 cases; and after 2 hours, 2 cases." The last two cases did not long survive. These tables of cases may be justly regarded as representing extremes, and a fair estimate of success can be made only by drawing the mean between them.*

"The reason that the want of success has been so great," says Playfair, "is doubtless the delay that must necessarily occur before the operation is resorted to, for independently of the fact that the practitioner is seldom at hand at the moment of death, the very time necessary to assure ourselves that life is actually extinct will generally be sufficient to cause the death of the fœtus. Considering the intimate relations between the mother and child, we can scarcely expect vitality to remain in the latter more than a quarter, or, at the outside, half an hour, after it has ceased in the former. The recorded instances in which a living child was extracted ten, twelve, or even forty hours after death, were most probably cases in which the mother fell into a prolonged trance or swoon, during the continuance of which the child must have been removed. A few authenticated cases, however, are known in which there can be no reasonable doubt that the operation was performed successfully several hours after the mother was actually dead."

The advisability of operating with the utmost dispatch in such cases has already been shown, but, since the maternal death was in some instances only apparent, the operation should always be performed with the same care and caution as if the mother were living.

Post-mortem Delivery Through the Natural Passages.—Mutilation of even the dead body is always to be avoided when nobody's interests will through it be promoted. This is especially true in those cases of sudden death during labor, when the friends have been looking forwards to a successful issue of the parturient act. The laity in general do not look with the

*"Probably the child will survive the mother's decease longer, *cæteris paribus*, in proportion to the suddenness of the woman's death. If she lay sick for a considerable period prior to death, the amount of oxygen in the blood at the moment of dissolution is presumably less than it would be at the instant of sudden death in a woman previously healthy." Dr. Underhill, *vide* Am. Jour. Obs., v. xi., p. 626.

same degree of horror upon contused, as upon incised wounds, and should the case seem as hopeful for the child still in utero from delivery through the natural passages as through laparotomy, our choice of procedure should not be made with any hesitancy. Such cases, we opine, are quite exceptional, and with the os still unrelaxed, and the pelvic passage narrow, we should not hesitate to use the knife upon the abdomen.

In rare instances the chances for saving fœtal life will be about as good by version as by abdominal incision. If labor has gone into the second stage before occurrence of maternal death, the forceps should be used without delay, when the pelvis is normal, in preference to the knife.

There are a number of recorded instances of spontaneous expulsion after maternal death.

Porro's Operation—*Oöphoro-Hysterectomy.*—Briefly this consists in removal of the uterus and ovaries through abdominal incision. It was first performed on a human subject by Dr. Horatio R. Storer, of Boston, in 1868, the patient dying sixty-eight hours thereafter.

Prof. Edward Porro, of Pavia, on the 21st of May, 1876, having had encouraging results from the operation on some of the lower animals, had the courage to perform it on a woman with a rachitic pelvis measuring an inch and a half in the conjugate. Both child and mother were saved. It has since been frequently performed with a mortality of about 28 per cent., and by some is now uniformly preferred to the Cæsarean section.

The operation has suffered several modifications, and has been somewhat simplified, especially by Tait, who gives the following account of it.

"I believe that the operation which I advocate is simpler in its performance than the application of the long forceps, and that any man who could do the one could certainly do the other, as I propose to lay it down before you. Eviscerating operations are always of the most protracted and terrible kind, absolutely fatal to the child, largely destructive to the mother, and may possibly be fatal even to the operator himself, who runs no small risk of injuring himself in the removal of the sharp fragments of bone. In advocating the performance of abdominal section in such cases it becomes perfectly evident that simplicity must be the order of the day. We must have no rival incisions nor complicated kind of sutures,

but a simple, straightforward method of proceeding which may be understood by anyone and practiced by the least competent amongst us. You must bear in mind that in the abdomen containing a pregnant uterus the conditions must always be alike, and that therefore this operation will always differ from all other instances of abdominal section, where, almost without exception, variety is the order of the day.

"It is practically impossible for every practitioner to be provided with all the numerous instruments which are wanted to make up the paraphernalia of the scientific obstetrician, while he would inevitably have at hand the few simple instruments required to perform the operation for which I am now arguing that it ought to be substituted for all the destructive and mutilating operations on the fœtus in impacted labor. What is required, you may carry in your pocket case: two or three pairs of catch forceps for arresting bleeding points, a small sharp scalpel, two or three bayonet-pointed suture-needles, some silk, a piece of india-rubber drainage tube, and two needles of steel wire, and none better than the ordinary stocking knitting-needle can be found.

"The first step in the operation is the abdominal incision, four inches in length, involving first the skin and then the muscles down to the sheath of the rectus, all of which ought to be divided by a sharp knife at one blow; then the tendon of the one or other of the recti is opened, the muscular tendons fall aside, the posterior layer of the tendons is nipped up by two pairs of forceps and divided between them. The extra-peritoneal fat is treated similarly, then the peritoneum raised again by two pairs of forceps, a slight notch being made between them; and the moment this is effected air enters, and all behind falls away. No director is required, nothing but an observant pair of eyes, lightly applied forceps, and a delicately applied sharp-cutting knife. The finger is then introduced into the peritoneal cavity, and the relations of the uterus and bladder exactly ascertained. The peritoneum is then opened to the full extent of the four-inch incision, and the cut edges of the peritoneum are seized on each side by a pair of forceps and are pulled severally to the respective sides. No better retractors can be employed.

"The piece of india-rubber drainage tube about eighteen inches or two feet long is now held as a loop between the fore and middle finger of the left hand, and is by that means slipped up over the uterus and pulled down over the cervix, passing the

fingers behind the cervix to see that coils of intestine are not included in it. One hitch is then made on the tubing when it has been got so far down as possible, and it is pulled as tight as is consistent with safety. The second hitch may be made in it, but what is far better, an assistant keeps the tube on the strain, so that the one hitch will be quite enough to effect the most efficient clamping.

"A small hole is then made in the uterus, just large enough to admit the finger; if it is possible, the position of the placenta may then be ascertained; if not, the right forefinger follows its colleague, and between the two, by gentle rending, an aperture is made in the uterus, and the leg of the child is seized. The fœtus is then carefully delivered feet first, and this, despite all the authorities to the contrary, is by far the best proceeding; less blood is lost, and it requires but very gentle manipulation to relieve the head.

"As soon as the fœtus is removed the placenta is sought for, and removed similarly; the uterus itself being then completely contracted by this time, is pulled out of the wound, and the elastic ligature is tightened once more, and finally arranged round the cervix, and the second hitch is applied. The main details of the operation are now completed; all that is required is to pass the needles through the flattened tube and through the uterus, and out at the other side, forming a St. Anthony cross or two parallel parts to support the weight of the uterus and the stump, and to keep it outside the wound. A complete toilet of the peritoneum is then made, not forgetting the anterior vesical *cul-de-sac;* stitches are passed in the ordinary way to close the wound accurately round the uterine stump.

"The uterus is now removed close down to the needles and strangulating rubber tube, so as to leave a little tissue above. It does not do to run any risk of the ligature slipping off, though this is hardly possible after the needles have been placed carefully through the structure of the tube. A little perchloride of iron is then rubbed gently over the surface of the stump; it is dressed with dry lint and some dry cotton gauze, an ordinary obstetric wrapper is put on, and the operation is at an end. The operation really takes very much less time to perform than it takes to describe, and as I have said before, because the details must always be the same as an operation in which there never can arise any unforeseen or unexpected difficulty."

The operation as thus performed by Tait is quite simple, and may be undertaken, in emergencies, by anyone of surgical experience. During our visit to this profoundly skillful operator a year ago, he had two cases of the kind, both of which did well.

Comparison of Cæsarean and Porro Operations.—"The best Porro record in Europe," says Dr. Robert P. Harris, "taken from its beginning, is that of Milan, under eight operators. The mortality in thirty-one cases has been 9, with only two children lost; this makes the percentage 29 against 5 5-7 per cent. in Leipzig under cœlio-hysterotomy. Vienna has had many more Porro operations than Milan, but lost 15 women out of her first 31. For the past four years, her unpublished record will show a much diminished death-rate; that of Milan, during the same period, being far higher. We may safely rate this operation as having therefore a general average mortality of twenty-eight per cent. In the year 1887 there were 53 'new Cæsarean' operations, with 11 women and 4 children lost, or a mortality of twenty and four-fifths per cent.; and in 1888, seventy-nine operations, losing 18 women and 3 children, or twenty-four per cent. The Cæsarean record shows a decidedly lower average mortality in both the women and children than that of the Porro operation. Both are capable of a considerable reduction in the death-rate, but the exsection of the uterus must always add to the gravity of a Cæsarean delivery in cases where this organ is sound and the child living. Where the child is dead and putrid, where the body of the uterus is the seat of fibroids, or where there are septic symptoms due to the condition of the uterus, the Porro-Cæsarean method is to be preferred. In exceptional tumor cases, where exsection is not advisable, the tumor should not be removed."

We should not forget, however, that for a successful performance of the new Cæsarean operation much more surgical skill is required than for the Porro operation as simplified by Tait, and hence the latter, outside of large cities, is more likely to be followed by recovery.

Laparo-Elytrotomy.—This operation was brought prominently to professional notice by Dr. T. Gaillard Thomas, and is intended as a substitute, in some cases, for the Cæsarean operation. It consists in making an incision from a point an inch above the right anterior superior spine of the ilium, with a slightly downward curve, on a line parallel to Poupart's

ligament, to a point one and three-quarters inches above and to the outside of the spine of the pubis. In deepening this incision, the skin, the aponeurosis of the external oblique, the fibres of the internal oblique, and transversalis muscles are divided, and then the transversalis fascia, which is here dense and separated from the peritoneum by a layer of connective tissue containing fat. The superficial epigastric artery is divided and must be taken up. When the peritoneum is reached it is carefully raised without being cut, so as to expose the upper part of the vagina, through an incision in which the fœtus is extracted. In incising the vagina there is great risk of hemorrhage. There is also great danger of cutting the bladder and ureter, and to avoid these the incision should be made nearly an inch and a half below the uterus, and in a direction parallel to the ureter and the boundary line between the bladder and the vagina. The right side of the patient is chosen on account of the position of the rectum on the left.

The operation has been performed but a few times, is not suitable to all cases, and, owing to its difficulties and special dangers, is not likely to become popular, hence we shall not here give at length its various steps.

Symphyseotomy.—When the fœtus is living, and the pelvic diameters are too contracted to admit of delivery by means of the forceps, the practice of obstetricians has been to destroy fœtal life and deliver a mutilated body, or to resort to Cæsarean section. There is now good hope that we shall not perpetually be driven to these dreadful alternatives, owing to a revival of the old operation of Symphyseotomy, first designed and performed by Sigault in the latter part of the last century. Since its revival the operation has been practiced almost exclusively by the Obstetric School of Naples, and by them is declared to be a godsend to humanity. The cleanliness of modern surgery may be the means of putting Symphyseotomy among the standard operations for dystochia due to pelvic contraction.

PART IV.

THE PUERPERAL STATE.

CHAPTER I.

PHENOMENA AND MANAGEMENT OF THE PUERPERAL STATE.

"The key," says Playfair, "to the management of women after labor, and to the proper understanding of the many important diseases which may then occur, is to be found in a study of the phenomena following delivery, and of the changes going on in the mother's system during the puerperal period. No doubt natural labor is a physiological and healthy function, and during recovery from its effects, disease should not occur. It must not be forgotten, however, that none of our patients are under physiologically healthy conditions. The surroundings of the lying-in women, the effects of civilization, of errors of diet, of defective cleanliness, of exposure to contagion, and of a hundred other conditions, which it is impossible to appreciate, have most important influences on the results of childbirth. Hence it follows that labor, even under the most favorable conditions, is attended with considerable risk."

Puerperal Mortality.—A large amount of statistical information is at hand respecting the mortality of woman in parturition and the puerperal state, but it is largely from hospital experience, and, as is well known, does not represent with any degree of accuracy the results of private practice. Drs. Matthews Duncan and McClintock have both given us some valuable figures, derived from various sources, from which it would appear that in English obstetrical practice the death-rate is between 1 to 120 and 1 to 146. According to another report by McClintock, his estimate was increased to 1 in 100. We cannot regard this as a fair estimate of puerperal mortality in American private practice. From the data at our command we are inclined to put it at about 1 in 200.

Phenomena Succeeding Delivery. These may be divided into the normal and the abnormal, and we will consider them in

that order. The larger number of puerperal women includes those whose lying-in follows an uneventful course up to the hour of complete restoration, and it is our purpose herein to follow such a case briefly, so that it may stand in the mind of the young practitioner as typical.

As soon as the excitement inseparable from the struggle and triumph of labor is over, the woman sinks into a delightful state of tranquillity of mind and body. At the same time she feels utterly prostrate from exertion, and somewhat stunned by the shock which parturition gives her sensitive, but patient, system. She is only languidly interested in what is now going on about her, and her enthusiasm can hardly be aroused. She is passive in the hands of her attendants.

In a large percentage of cases a nervous tremor comes over the patient, which often proves distressing. It is unaccom-



FIG. 303.—Pulse in a Primigravida. (After Barnes.)



FIG. 304.—Pulse during Expulsion. (After Lorain.)

panied by real chilliness, though it is more likely soon to terminate if the body be warmly covered.

But these symptoms are short-lived, rapidly giving way to a lively interest in details, steadiness of nerves, warmth and moisture of the skin. The puerperal toilet once fully completed, and the child, after its bathing and dressing, laid beside the mother, drowsiness soon "steeps her senses in forgetfulness," and nature sets earnestly at work about her repair.

THE PULSE.—During pregnancy, as we have already said, certain important changes take place in the circulatory apparatus, in the vital fluid and in the nervous forces which govern them. In the blood, repeated examinations have disclosed a diminution in the number of red corpuscles, and an increase in the quantity of fibrin. At the same time there is a marked increase in the quantity of the fluid, somewhat in excess of the demands made by the augmented uterine vascularity. Other changes have been noticed, but they are of minor importance. This gives us then a plethora, so far as the mere quantity of

circulating fluid is concerned, but an anæmia with respect to the red blood globules; while at the same time, and especially in the latter part of pregnancy, we have a condition of hyperinosis. Consentaneously with the increase in quantity of blood, certain cardiac changes take place with a view to greater capacity and power. The heart cavities become slightly enlarged, and the ventricles somewhat hypertrophied. This condition was first made known by Larcher, in 1857. Cardiac, like uterine, hypertrophy disappears after pregnancy has ended; but reduction is somewhat retarded by lactation. As the uterus augments in size, and the necessity for providing increasingly more oxygen for the fœtus strengthens, the vessels become multiplied, both in number and size, until, at the close of pregnancy, this organ becomes truly cavernous, and contains a great quantity of the vital fluid. Meanwhile the woman has become a storage battery for the accumulation of nerve



FIG. 305.—Pulse immediately after expulsion. (After Lorain.)



FIG. 306.—Pulse a few hours after delivery in a patient who had suffered a profuse, but not dangerous, hemorrhage. (Taken by Prof. Crawford.)

force, so as to be well provided against the exhausting effects of a difficult parturition.

Such changes as these have an important influence on the general circulation, which is exhibited to a certain degree in the radial pulse. Under these conditions in normal pregnancy, what characters should we expect to find in the pulse? First of all, we would look for a good degree of arterial tension; secondly, for ordinary frequency, and thirdly, for fair regularity. These are the very peculiarities which are ordinarily found. Dr. Mahomed was the first to call attention to these characteristics. Fig. 308 is that of a typical pulse in the non-pregnant state, and Fig. 303 is a presentation of the normal curves in pregnancy, between which we discover significant differences. In sphygmographic tracings the more marked the plateau at the summit of the first ascending stroke, usually the more pronounced is the arterial tension. Care must be taken, however, not to confound ordinary tension with the condition of athero-

matous degeneration which produces a somewhat similar tracing.

After delivery, the condition in some respects is altered. The uterus, having been emptied, contracts and condenses so as in great measure to reduce the quantity of blood circulating within its walls. It is this firm contraction of the organ in normal cases which prevents post-partum hemorrhage.

As the placenta is pushed off from the uterus by the shrinkage and contraction of the surface to which it is attached, solution of continuity involves many of the sinuses, which would in every case result in serious loss of blood, were not only the mouths, but also the entire calibre, of these vessels nearly, or quite, closed by the uterine contraction. What hemorrhage we do have occurs chiefly during the interval between placental separation and expulsion, since thorough contraction cannot ensue while the uterine cavity is still occupied, even

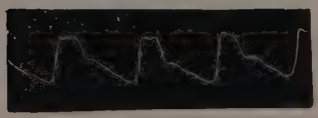


FIG. 307.—Pulse seven days after delivery. (Taken by Prof. Crawford.)

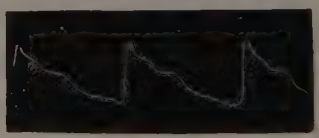


FIG. 308.—Pulse of non-pregnant woman in health. (After Barnes.)

though not widely expanded. Closure of these large uterine vessels creates considerable change in the circulation, which, for a few minutes, sometimes for a much longer period, is felt by the heart and larger vessels. The tumultuous effect is well shown in Fig. 305. Some blood is lost, but, in the average case, not as much as is now thrown out of the uterine circulation and forced into the systemic vessels. The result is increased arterial tension.

These are rapid and important changes, and must produce manifest effects upon the pulse. Immediately after delivery there is pallor of countenance and diminished heat at the periphery, under which conditions, other things being equal, arterial tension would be further increased.

Under these changed conditions, what sort of pulse should we expect to find? Certainly not a rapid and compressible one, but the very opposite; and that is what we do find. Blot first called professional attention to the retardation and high ten-

sion of the early puerperal pulse. After labor it frequently goes as low as 55 or 60, and in some cases as low as 40 or 45. This it does in conformity with the law of physics which provides for an inversed ratio of frequency and tension. This we may regard as the normal pulse at that period in puerperality. In some we find a different state of things. We have occasionally noticed, soon after delivery, a very rapid and feeble pulse, but chiefly in those cases where an anesthetic has been used to the extent of full narcosis. A similar state of the circulation is found after free hemorrhage; and, indeed, at such a time it would ordinarily be expected. However, the case from which Fig. 306 was taken, suffered a great loss of blood post-partum, and yet this tracing, taken on the same day, disclosed a pulse which, in the non-puerperal state, would be regarded as about normal in form and frequency. Other conditions and circumstances are sufficient to establish a similar state, such, for example, as expansion of the arteries in certain parts of the body, through action of the vaso-motor nerves. It may also occur from vascular excitement. Some have attached considerable significance to a deviation from the normal slow pulse of the early puerperal state, claiming that a rapid pulse is indicative of threatened hemorrhage. There is a rapid pulse *following* hemorrhage, but not necessarily *preceding* it. "These notes," remarks J. Ashburton Thompson, in the *Obstetrical Journal*, volume V, page 285, "justify a contradiction of the bare assertion that a pulse which beats at or about 100 shortly after labor prognosticates inertia of the uterus." In the same journal, volume VII, page 556, Dr. M. M. Bradley gives his experience with reference to this symptom in 300 cases, and says: "From these observations I am not inclined to attach much importance to the pulse rate, either as a sign of danger, or of post-partum hemorrhage." We notice that our good friend Dr. G. R. Southwick, of Boston, thinks otherwise, for he says in the *Homeopathic Journal of Obstetrics*, volume VIII, page 176: "A pulse remaining at 100, and slowly rising, is often the forerunner of hemorrhage." As an index of an enfeebled state of the general system, and hence of greater proneness to uterine relaxation, it may have some bearing on the prognosis. With



FIG. 309.—Pulse of same woman (Fig. 315) under extreme nervous excitement. (After Barnes.)

a full, tense, and slow pulse, we should certainly consider the patient in *less* danger of post-partum hemorrhage.

As the normal puerperium advances, the pulse becomes a little more rapid, and loses some of its tension. Retardation and tension are not usually very marked after the third day, and, when their disappearance is deferred, we ought more attentively to watch our case. As late as the seventh day the pulse, in the case from which Fig. 307 was taken, still showed a very high tension. If the pulse loses these characteristics in a few days, and they subsequently return for a protracted period, the patient should be carefully watched for serious symptoms.

Continuously increasing arterial tension usually signifies either a chill or a state of constipation, and calls for appropriate treatment. Neglect of precautions may result in albuminuria and eclampsia.

Under the influence of the vascular excitement attendant upon the establishment of lactation, the pulse usually becomes frequent and soft. Vascular excitement and nervous excitement produce entirely different effects; the former diminishing, and the latter increasing, the arterial tension.

Within the first few days following delivery, with the vascular system unusually full, we can readily see what serious results would be liable to follow a sudden chill, a profound emotion and a variety of other occurrences. It is doubtless to this condition of the vascular system that inflammations involving vital organs owe their unusually fatal results. Taking the slow, ample, strong pulse as a typical one in the early days of the puerperal period, it behooves us, as careful obstetricians, attentively to observe and investigate deviations from it. We cannot afford to neglect the clinical thermometer, but we may be excused from using it at every visit, provided we attentively regard the pulse. Serious symptoms will not be found in process of development, nor in full bloom, without there being some indications of them in the pulse. Whenever at any visit a change is discovered, we should not fail to consult the temperature, and make such other physical examinations as will be likely to throw light on its causes.

Post-partum Blood Changes.—The changes in the blood incident to utero-gestation, already described, have a decided influence over the puerperal state. The hyperinosis which already existed is now considerably augmented by the changes

which follow delivery. The copious supply of blood which had been given the uterus is now turned into other channels, and the involution of the uterus, which now begins, throws into the circulation a considerable quantity of effete matter, to get rid of which all the excretory ducts are opened, and all the eliminative processes are set vigorously at work. These facts must be borne in mind as we advance in our study of the puerperal condition.

Temperature.—The skin, the activity of which was diminished during gestation, now becomes functionally excited, and, in normal states, is always soft and moist, especially during the first week. Perspiration often becomes profuse without the development of any morbid symptoms, save a miliary eruption on different parts of the body, which may occasion some annoyance. A certain amount of perspiration in the puerperal woman is doubtless a salutary action, and an excessive degree of it may usually be prevented by keeping the temperature of



FIG. 310.—The clinical Thermometer.

the lying-in chamber from running too high, and forbidding the nurse to burden the patient with bed-clothing.

During labor the patient's temperature is slightly elevated as a result of her strenuous efforts, and the strong perturbation of mind and body. It rarely goes above 100° F. and, after delivery, soon descends to normal or below. During the first few days after delivery the average temperature is slightly above that of perfect health. In strictly normal cases, there is no so-called "milk fever," though the temperature is liable to rise a degree or so during the stage of mammary engorgement, especially in galactorrhœa.

In women of sensitive, nervous organization, there is often rapid ascent and descent of the temperature. This movement is sometimes traceable to most trivial causes. It may be laid down as a rule that sudden elevation of temperature in puerperæ, to a moderate height, should not be interpreted as indicative of impending serious disturbance, unless the movement be often repeated, or the elevation be maintained.

The following diagram illustrates the temperature of a puerperal woman, taken morning and evening during the first

ten days following delivery, in whom no other unfavorable symptoms were manifested. In fact, repeated observations have satisfied the author that, in conditions which do not present any morbid symptoms whatever, among people in their quiet home life, the temperature of the body often attains a height of 100°.

Uterine Involution.—The uterus, after delivery, tends to resume its original volume with astonishing rapidity. Though this change does not occur with uniformity and precise regularity, since various occurrences may serve to retard the action, yet we find that, in general, it observes the following course: Immediately after expulsion of the fœtus the organ contracts firmly, and, as elsewhere stated, may be felt through the ab-

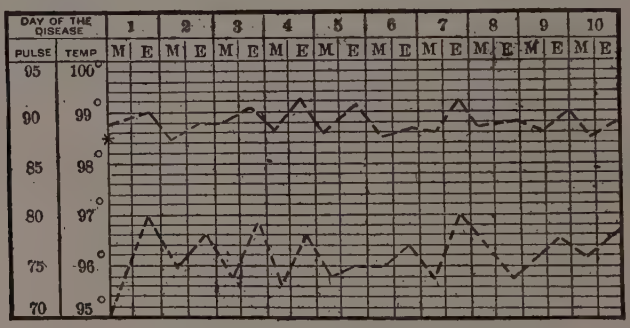


FIG. 311.—Diagram showing Temperature and Pulse Curves in a normal case.

dominal walls, as a hard mass, like a cannon-ball. Alternate relaxations and contractions take place at intervals, and aid no doubt in the physiological process of involution.

Extreme relaxation is a pathological state, and tends to the formation in utero of coagula, and in some cases permits profuse hemorrhage. The condition is also apt to lead to entrance of air into the uterine cavity, favoring decomposition and septic infection.

During the first two or three days following the first condensation the organ does not diminish much in size; but thereafter reduction is usually quite rapid. At the close of the first week its fundus is found not more than one and one-half or two inches above the pelvic brim, and three or four days thereafter it cannot be felt through the abdominal walls except by conjoint touch. In many cases uterine involution is arrested at about this point, and, as a result, the woman suffers from pelvic

discomfort until the condition is discovered, and by appropriate treatment rectified.

In normal cases complete involution is effected in six or eight weeks. The progress of uterine diminution is graphically shown by Heschl, from the weight of the organ at different periods. Immediately after delivery he found that it weighed 22 to 24 oz.; in one week it was reduced to 19 to 21 oz.; at the



FIG. 312.—Uterus of a Multipara at term. (Charpentier.)

end of the second week it weighed 10 to 11 oz.; at the close of the third week it weighed 5 to 7 oz.; and in eight weeks its weight was but a little in excess of that which preceded the first pregnancy.

Reduction of the uterus to its non-pregnant size usually goes on uninterruptedly, but, it may be impeded by too early rising, nonuse of the lacteal secretion, and laceration of the cervix uteri.

After-pains.—Firm contraction immediately succeeds labor, and orderly involution of the uterus is commonly accomplished without pain; but in some primiparæ, yet more



FIG. 313.—Inner surface of Uterus after delivery. (Coste.) P, placental site. S, uterine sinus. V, uterine veins. A, uterine arteries. R, round ligaments.

especially in multiparæ, the process gives rise to what has been significantly termed "after-pains."

Rhythmical contractions of the uterus, as we have before said, take place throughout pregnancy, and parturition is but

an intensification of them. After labor, involution is excited by a continuation of the same action. As these contractions are usually painless during pregnancy, so are they during puerperality, complicating conditions alone rendering them painful. The presence in utero of coagula, with augmented uterine effort at expulsion, is the efficient cause of after-pains. They occur much more frequently in multiparæ than in primiparæ, because, in the former, the uterine cavity is larger, and the rigidity and tonicity of fiber observable in primiparæ has, in a measure, been lost. They are to a certain extent preventable, the prophylactic means being those which favor firm contraction of the uterus, among which abdominal pressure and kneading take a prominent place. The pains begin soon after delivery, and are recurrent, like those of labor. They are sometimes extremely severe. Application of the child to the breast, though a wise proceeding, increases the intensity of the after-pains.

Their period of duration varies, seldom being protracted beyond two or three days. In some cases, after having disappeared, they return for a time, and again leave after escape of a retained coagulum. They may be so severe as to extort cries, and are dreaded by many women almost as much as the pains of labor.

After-pains should not be confounded with the pains accompanying peritoneal inflammation, from which they may generally be distinguished by the absence of elevated temperature, rapid pulse and abdominal tympanites and tenderness.

The uterus sometimes appears to be in a condition of hyperæsthesia, wherein the intermittent contractions which characterize the puerperal state, unassociated with the presence of coagula, occasion much suffering. Dewees mentions a pain of frightful intensity which is experienced by some women in the lower part of the sacrum, and in the coccyx. It begins soon after delivery, and, unlike real after-pains, is continuous. We have never had our attention called to it.

Treatment.—When after-pains plainly depend on the presence in utero of coagula, pressure judiciously applied to the fundus uteri, by expelling the uterine contents, sometimes affords relief. When of a neuralgic character, heat to the abdomen will be found agreeable and beneficial.

There is no question that the prompt administration of *arnica*, after delivery, has a modifying influence upon this variety of suffering; while, in some cases, it serves as an efficient

prophylactic. Other remedies are often of great service, and some of the indications for their use here follow:

After-pains extremely severe and long-lasting: *aconite, nux v.*

After-pains too long, or too violent; worse towards evening: *pulsatilla.*

After-pains too long and severe; though cold, she does not wish to be covered: *secale.*

After-pains of a cramping nature, often attended with cramps in the extremities, especially in women who have borne several children: *cuprum.*

After-pains worse in the groins; over-sensitiveness; nausea and vomiting: *actæa rac.*

After-pains violent; return when the child nurses: *arnica.*

After-pains excited by the least motion, even taking a deep inspiration: *bryonia.*

After-pains especially after long hard labor, spasmodic across the hypogastrium, extending into the groins: *caulophyllum.*

After-pains very distressing, especially in women who have borne many children: *cuprum m.*

After-pains violent in sacrum and hips, with severe headache, especially after instrumental delivery: *hypericum.*

After-pains with much sighing: *ignatia.*

After-pains with great sensitiveness of the abdomen: *sabina.*

After-pains of a severe bearing character, as if everything were being forced out: *belladonna.*

After-pains come and go suddenly: *belladonna.*

After-pains very distressing, and the patient extremely irritable: *chamomilla.*

After-pains which produce a desire to defecate: *nux v.*

After-pains colicky, causing her to bend double: *colocynth.*

After-pains producing faintness: *nux vom., pulsatilla.*

After-pains worse at night; she wants the room warm, and must be well covered: *rhus tox.*

After-pains accompanied with burning and bearing: *terebinth.*

We have found *caulophyllum* most frequently useful; it is to be avoided, especially in fluid extract or tincture, when there is too free a flow.

The Excretions.—The activity of the skin has been pointed out. The urine also is secreted in large quantities, but difficulty in voiding it is often experienced on account of temporary paralysis of the vesical cervix, or from swelling and occlusion of the urethra.

The rectum is for a time inactive, a condition not at all inimical to the woman's well-being at this particular period.

Examination of the urine reveals a trace of sugar, varying in quantity with the volume of the lacteal secretion, being most abundant when the breasts are distended, or when, from any cause, the milk is not drawn.

Changes in the Uterine Mucous Membrane.—Without entering into a minute description of the post-partum changes occurring in the uterine mucous membrane, it will suffice to say that the inner surface of the organ is covered with coagulated blood, upon removing which we find a soft, moist, reddish-grey friable layer, covering every part, except that recently occupied by the placenta. Beneath this is the imperfect freshly formed mucous membrane. The deciduous layer does not extend into the cervical canal, but the latter is found filled with a free secretion of a glutinous, transparent, pinkish or bloody mucus.

The placental site is elevated, and presents a mammillated, rounded, anfractuous surface, dotted over with coagula which are removed with difficulty. The walls of the venous sinuses, epecially at the placental site, are thickened and convoluted, and contain a small blood-clot, while their mouths are perfectly visible.

From what we have just said it will be correctly inferred that the cervical mucous membrane is not exfoliated. During pregnancy it is simply hypertrophied, and, after labor, the arbor vitæ are discernible, though in a modified form.

Vaginal Changes.—The vagina is shortened and diminished in caliber, the rugæ return, and the external orifice and vulva soon assume much their former appearance. A strong contrast is established between the conditions which are observed immediately after delivery and those observed at a little later period.

The Lochia.—The discharges which escape from the vulva after delivery are known as the *lochia*. The period of their continuance varies, but there is generally more or less discharge for three or four weeks. In some women, especially those who do not nurse, they run into a bland leucorrhœa, which persists until menstruation returns. At first they are composed almost wholly of blood, both fluid and coagulated. Clots of considerable size often accumulate in the uterus and vagina, especially in multiparæ, and are discharged, with recurrent pains, during the first twenty-four or forty-eight hours.

After the first day, the lochia consist of about one-third part red corpuscles, while the other matters are chiefly white corpuscles, blood serum, numerous epithelial cells, and mucus. After the second or third day the red corpuscles almost wholly disappear. As soon as the lacteal secretion begins to be established, the lochia are greatly diminished in quantity, but soon again become profuse, accompanied with some blood, and later, pus corpuscles; but the blood usually disappears about the close of the first week. The discharge then continues, yellowish-

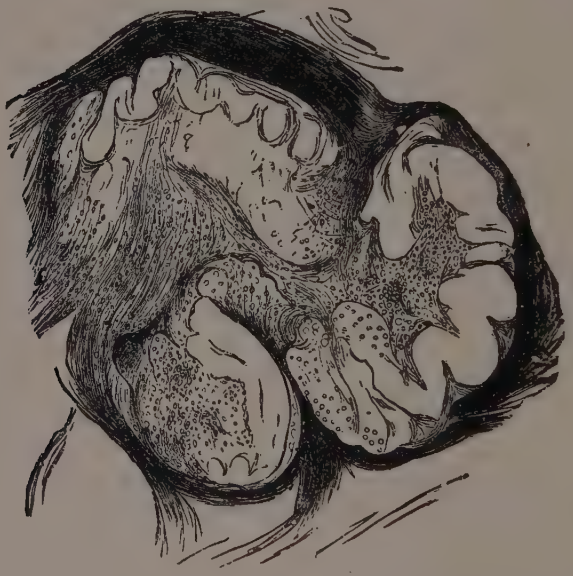


FIG. 314.—Section of a Uterine Sinus from the placental site nine weeks after delivery. (Williams.)

white in color, and of some consistency. At this stage it has been called the "green waters."

The amount of flow varies widely. Instead of gradually diminishing, until final disappearance, it sometimes continues profuse for four or six weeks, without being accompanied by morbid symptoms. A persistence, or occasional recurrence, of a sanguineous discharge is generally indicative of irregular and imperfect progress of uterine involution.

The odor of the discharges at times is quite offensive, even in those cases which present no other morbid symptoms. Such a condition, however, should always be looked upon with sus-

picion, since it may indicate retention of either some part of the secundines, or coagula in which putrefactive changes have been set up. The danger of infection may be diminished by carefully syringing the vagina, two or three times daily, while the offensive odor continues, with a mild antiseptic solution. The lochia are sometimes suppressed for an interval, without the occurrence of bad symptoms. In other cases morbid conditions begin to appear, which, if properly treated, will often be at once arrested. The following indications will be found valuable:

Lochia suppressed by cold or emotion: *actæa race.*

Lochia suppressed, head feels as if it would burst: *bryonia.*

Lochia suppressed, followed by diarrhœa, colic and toothache: *chamomilla, caulophyllum.*

Lochia suppressed, violent colic: *colocynth.*

Lochia suppressed, from anger or indignation: *colocynth.*

Lochia suppressed, with tympanitic swelling of the abdomen, and diarrhœa: *colocynth.*

Lochia suppressed by cold or dampness: *dulcamara.*

Lochia suppressed from fright: *opium, aconite.*

Lochia suppressed, with nymphomania: *veratrum a.*

Lochia scanty and offensive: *nux vom.*

Lochia scanty, becoming milky; heat, without thirst: *pulsatilla, stramonium.*

Lochia too profuse, with burning pain in uterine region: *bryonia.*

Lochia profuse: *millefolium, trillium, chamomilla.*

Lochia profuse, excoriating, protracted: *lilium.*

Lochia milky, too protracted: *calcarea carb.*

Lochia long-lasting, thin, offensive, excoriating, with numbness of the limbs: *carbo an.*

Lochia vitiated and offensive: lasts too long, or often returns: *rhus tox.*

Lochia protracted; great atony: *caulophyllum.*

Lochia protracted; drawing about ovaries; discharge fœtid, cheesy, or purulent: *china.*

Lochia protracted, profuse, excoriating: *lilium.*

Lochia acrid, fœtid; great prostration: *baptisia.*

Lochia offensive, feels hot to the parts: *belladonna.*

Lochia brown, foul smelling: *carbo veg.*

Lochia very offensive and excoriating; repeatedly almost ceases only to freshen again: *kreosotum.*

Lochia dark, very offensive; scanty or profuse; painless, or accompanied by prolonged bearing pain: *secale.*

Lochia offensive, irritating: *sepia.*

Lochia increased; pain in the back when nursing: *silicea.*

Lochia return when she first gets about: *aconite.*

The Lacteal Secretion.—The mammæ for some time before labor are furnished with a variable quantity of a peculiar fluid known as *colostrum*, which contains a number of large granular and fat corpuscles, and some milk globules. Within the first two or three days this is succeeded by the proper lacteal secretion, the establishment of which is sometimes attended with a slight acceleration of pulse and elevation of temperature, and also some restlessness and headache, which condition was formerly termed the "milk fever." These phenomena generally disappear as soon as the secretion has been well established and the breasts properly cared for. The profession is rapidly coming to believe that "there can be little doubt that the importance of the so-called milk fever has been immensely exaggerated, and its existence, as a normal accompaniment of the puerperal state, is more than doubtful." Out of 423 cases reported by Macan, in 114 there was no rise of temperature. A number of recent writers on the subject refer the phenomena described to coincident septic influences; but, from careful observation, we are led to believe that the symptoms when present, owe their existence mainly to the irritation proceeding from over-distension of the breasts. Decided relief is at once afforded by emptying them.

The lacteal secretion does not make its appearance in every case. When, from any cause, a considerably elevated temperature follows closely upon delivery, the milk may utterly fail to appear. Again, it would seem, as Dubois has remarked, that nature has left her work unfinished in some women. They are capable of becoming mothers, and are able to provide suitable nourishment for their children throughout the period of gestation, but forever thereafter the latter is forced to lead an entirely independent physical existence.

THERAPEUTICS—*Secretion Abundant.*—Breasts greatly and painfully distended with milk: *aceticum ac.*

Secretion too abundant: *calcarea carb., uranium, pulsatilla.*

Excessive flow of milk, causing great exhaustion: *phytolacca.*

Secretion Deficient.—Milk scanty or absent; despairing sadness: *agnus c.*

Deficiency of milk with over-sensitiveness: *asafœtida.*

Scanty secretion of milk: *bryonia.*

Mammæ seem distended, but milk scanty: *calcarea carb.*

Little milk in mild, tearful women, presenting no morbid symptoms: *pulsatilla.*

Milk scanty or vitiated; child refuses it: *mercurius.*

Scanty milk, with debility and great apathy: *phosphoricum ac.*

The secretion is not established; stinging in the breasts: *secale.*

Insufficiency of milk, or entire failure to appear: *urtica urens.*

Quality of Secretion.—Milk watery and thin: *calcarea phos.*

Milk thin, blue; patient sad and despairing on waking: *lach.*

Milk yellow and bitter, child refuses the breast: *rheum.*

Pain in the back on nursing; increase of lochia; flow of pure blood. Complains every time the child takes the breast: *silicea.*

Management of the Breasts in Non-nursing Puerperæ.—When from any cause lactation is not performed, the breasts require most careful attention. They are liable to become distended, heated and painful, and, if not properly treated, inflammation and suppuration may ensue.

We believe the best sort of general treatment for these patients is the expectant one. It is unwise to tamper with the breasts at all unless they become hard and painful. Meanwhile they should be kept warm by the application of a layer of cotton, over which may be spread a piece of oiled silk. If the distension becomes excessive, it should be partially relieved by drawing only a small quantity of the secretion. If they become hard and lumpy the nurse should be instructed freely to apply warm oil and rub them in a gentle manner, always making the passes towards the nipple. If in any case inflammation begins, hot fomentations should be faithfully followed, until the pain and soreness disappear. A most excellent manner of applying the heat is to take a basin of sufficient size, and line it with two or three thicknesses of flannel wrung out of water as hot as can be borne, and then place it over the breast. By this means the heat can be retained for a long time.

In certain cases we may think best to subdue the functional activity of the gland by the use of camphorated oil. We

believe the use of belladonna plasters, as recommended by some, unwise practice, since it interferes with other, and more effective treatment.

"The comfort of non-nursing puerperæ will be secured," "says Dr. Geo. B. Peck, and their welfare enhanced by so supporting the breasts that their axes will deviate but slightly from the perpendicular to their bases. Whether simple slings, or a figure of eight bandage, or any other of the countless contrivances that have been devised, is resorted to, is inconsequential *provided* the desired result is obtained without annoyance to the invalid and without repressive action on the lactiferous system. The fame of a bandage used at the Boston (Mass.) lying-in hospital had reached my ears, but without details, so I called for information at the institution about a month ago. It is made of two strips of cotton cloth, each doubled and nicely stitched and then sewed together in the shape of the letter **T**, the horizontal strip being somewhat longer than the upright. Different sizes are kept constantly on hand; for after use they require simply to be laundried, when they are nicer than ever. In the specimen I chanced to see, the length of the respective strips was apparently twenty-four and thirty inches, with a common width of about three and a half inches.

"When used, a "bias" is taken in the horizontal piece exactly over the center of the upright and held in position by one or more safety pins, thus converting the letter into a **Y**. The size and style of the bias depends, of course, on the contour of the breast to which it is to be applied. The upright is now placed transversely across the back of the puerpera, the apex of the **V** portion coming just below, say the left axilla, and each arm extending respectively above and below the left breast. These are now drawn snugly in the direction of the right breast when their free ends are brought together on its axillary border, and there are securely pinned to the base of the upright. Finally the two arms are caught together at the intermammary space by a large safety pin, thereby securing greater steadiness and support. Of course a few folds of cloth or cotton may be placed between the breast and the bandage in case of marked irregularity of contour, but generally the single band is amply sufficient. It will be noted that the effect of this simple device is to afford abundant support to those portions of the breast in which trouble generally originates *without exerting compression:* the result is that any excess of

the lactiferous fluid pours spontaneously from the nipple, and the liability of the ducts to occlusion is reduced almost infinitesimally."

Our therapeutical resources are but few.

Camphora is most frequently used locally, but its action will be increased through internal administration.

Belladonna has a very decided influence to diminish the lacteal secretion. While we deprecate the local use of the drug by means of plasters, because of interference with other local measures, we advise its exhibition by the mouth or by ointments applied to the mammæ.

Castor oil in cathartic doses, especially when the breasts are greatly engorged, appears to have a most salutary effect.

General Attention to the Puerperal Woman.—The puerperal patient requires plenty of fresh air, without exposure, wholesome food, quietude, and cleanliness. In warm weather the doors and windows should be opened often enough to keep the air of the room fresh and pure, while everything about the apartment which tends to contaminate should be scrupulously removed. The room selected for the confinement should not be near a water-closet, or bath-room, and should have no stationary washbowl, as more or less foulness is emitted by all such connections with a sewer or cesspool. The bed should be placed so that the patient will not be in the line of a draft when the doors and windows are opened. In the cold seasons the temperature of the room should be kept as even as possible, at about 65° or 70° F.

It is assumed that the labor has been conducted with a strict regard to cleanliness, whether the details of antiseptic treatment have been observed or not. Great care ought now to be exercised, in order that our efforts in this direction be not rendered wholly inoperative by errors or ignorance of the nurse. The best of them will bear watching. Not long since I learned that it was a common practice of nurses at our own hospital to deposit, without washing, the syringe nozzle, after use, in the mouth of the bag, as a convenient manner of hanging up the long tube.

After delivery, the soiled clothes should be drawn away, the vagina douched and the vulva washed. No subsequent douches ought to be employed unless the lochia become offensive.

The woman should be encouraged to urinate within the first six hours, whether there be any inclination thereto or not. In

the absence of special contra-indications she may sit up to do so if necessary.

We do not deem it advisable to have a record of the pulse and temperature made by the nurse unless there are indications of a necessity therefor. Nervous, apprehensive patients are often done infinite harm by the words and demeanor of nurses who follow this practice.

The Physician's Visits.—The puerperal condition is one in which sudden and alarming changes are liable to occur, and the physician should make his patient diurnal visits for at least three or four days. The interval between delivery and the first visit ought not to exceed twelve hours.

At each visit during the first two or three days, in normal cases, in addition to the ordinary observations, the uterus should be examined by placing the hand on the abdomen, the temperature taken, and the urinary and lochial discharges inquired after. The condition of the breasts will also demand his attention.

Retention of Urine.—This is one of the most frequent complications of the puerperal state, and occasionally proves to be one of the most annoying.

The prudent accoucheur encourages his patient to keep the bladder empty during parturition as long as voluntary micturition can be performed.

This is not all, for it is hardly safe to put the utmost reliance upon the result of voluntary urination, since, even during parturition, there may be vesical atony resulting in partial retention. It is, therefore, wise to make careful palpation and percussion of the hypogastrium to determine whether the bladder gives evidence of distension or of complete evacuation. In case of doubt, the catheter ought to be carefully passed. Having made himself sure of vesical non-distension up to a late moment in parturition, the bladder will receive no further attention until some hours after delivery. In many instances the woman experiences a desire to micturate within the first few hours; but in many other cases, ten, fifteen, or even twenty hours may elapse before the patient's attention is drawn by her feelings to the performance of this act. An effort is then made, which may prove utterly futile, and the patient find herself wholly unable to obtain relief.

This condition of urinary retention is liable to occur after an ordinary case of labor, but it is oftener observed after deliv-

ery attended with extreme difficulty, and terminated either naturally or artificially. Still it is in only a certain percentage of instrumental deliveries that the complication is met.

The etiological factors are here two in number: the one, extreme atony or partial paralysis, and the other, spasmodic contraction of the sphincter vesicæ. The former is chiefly the result of dystocia, the bladder being constrained and somewhat crippled during pregnancy by extreme uterine distension, and finally overpowered by a tedious parturition. Spasmodic retention is sometimes a hysterical manifestation, but is oftener a result of irritation reflected from a torn vestibule or perineum. We are personally of the opinion that the great proportion of all cases of urinary retention find their immediate cause in vesical atony.

It is a clinical observation that retention which is not soon overcome is extremely liable to become prolonged, and may even annoy the woman until she is able to be about the room. We believe it never far exceeds these bounds.

TREATMENT.—Every precaution should be taken to avert this annoying complication of puerperality. There is not much to be done, except to observe ordinary care in the general management of the case during parturition and the period immediately succeeding it; but there are some things which we ought most scrupulously to avoid. What has impressed this truth forcibly on our mind is a case which we witnessed some time since, in which, a few hours post-partum, most injudicious treatment was adopted. The woman had passed through an instrumental delivery of considerable difficulty, and at the first visit, made a few hours thereafter, the excellent practitioner who had charge of the case, assuming that there would be urinary retention, without giving the woman an opportunity to empty the bladder in a natural way, assured her that she would not be able to do so, and passed the catheter. The after history was in keeping with the assurance given, and artificial means for vesical relief were found necessary for a number of days. To be sure this patient might have failed to urinate if given the opportunity, and encouraged by a more favorable prognosis; but we believe that retention is sometimes excited by unnecessary interference. This we regard as an example of meddlesome midwifery. Another important precaution to be observed is, to have the woman make one or repeated attempts to urinate within the first six or eight hours after delivery.

We look upon this as a maxim of wise policy, inasmuch as distension of the bladder is inimical to spontaneous evacuation. There are many women who find themselves absolutely unable to urinate while in the recumbent posture, who readily succeed when allowed to sit. It is accordingly our practice to direct, that, in the absence of decidedly contra-indicating conditions, the patient be permitted to assume the sitting posture if necessary, and we have not had occasion to regret the permission.

There are certain remedies which, under these circumstances, are capable of lending considerable aid.

Belladonna is one of the best of them, and is especially indicated in those cases where there has been small loss of blood, and the pulse discloses considerable arterial tension. Spasmodic retention is more likely to give way under this remedy than is retention due to vesical atony, although in both instances it may prove efficacious.

Hyosciamus is indicated when there is lack of disposition to urinate, though there may be desire. Nervous and irritable.

Camphor is also said to be a good remedy, but we have thus far observed no favorable effects from its use.

Aconite is specially serviceable when the woman has exhibited good reaction from the strain of labor, attended with a moderately strong and rapid pulse.

Arsenicum is sometimes effective where there is retention unaccompanied with desire to urinate.

Nux vomica is indicated by frequent or constant desire and ineffectual effort.

Cocaine.—Injection of a four per cent. solution into the urethra will often obviate resort to the catheter.

The Faradic current has been found serviceable in some of these cases, especially those wherein the retention is attributable to uterine atony.

These are the only remedies which we now recall as having been in any degree serviceable in this affection.

There are little expedients, such as the use of hot fomentations and gentle kneading of the hypogastrium, that occasionally contribute to the effect sought, and are worthy of trial; but, despite them and any other remedial agent at our command, we are occasionally driven to conjure the aid of the catheter.

This instrument, however, ought not to become our sole reliance; but remedies should be continued, and the woman

encouraged to make frequent, though not strong, efforts, at suitable intervals. In case of failure, the catheter should be introduced every six or seven hours, and the bladder thoroughly emptied. When we are driven to the use of this instrument for any considerable time, it is well, every twenty-four or forty-eight hours, to wash out the bladder with a mild antiseptic solution.

Repeated use of the instrument is liable to set up urethritis, and therefore the operation must be performed with the most extreme delicacy. In the absence of a trained nurse, it is better for the attending physician to use the instrument. Still, an intelligent attendant, with a little instruction, can be made competent to pass it when the vulva is exposed.

It goes without saying that this minor operation should not be performed in neglect of antiseptic precaution. Many nurses are grossly heedless, and require repeated injunction, and close surveillance. We are fully persuaded that serious results have many times proceeded from use of an unclean catheter.

Regimen.—The regulation of the diet of lying-in women has been thoroughly revolutionized during the past few years. The older custom was to keep them on food of the lightest kind, given in small quantities for several days succeeding delivery; but it has now become customary to prescribe a liberal supply of good nourishing food. There is danger, however, of running to an extreme in this direction, and thereby destroying the benefits which are derivable from a well-regulated regimen. Our best guide in the matter are the patient's feelings. If she has no appetite, it would be unwise to insist on a generous diet; but, on the contrary, if the appetite is good, we may safely be generous. Part of a cup of beef tea, a glass of milk, an egg beaten up with milk, or some toast may be given soon after labor. If there is a desire for it, a few mouthfuls of beef or chicken can be given after the first day. When lactation has become established, the restrictions on diet may be almost wholly removed, after cautioning the patient against overloading the stomach. Less care will be required in the case of robust women than in those who are delicate; and, while we feed the latter well, we should be exceedingly careful about both the quality and quantity of their food. Stimulants should, as a rule, be avoided.

The Bowels.—It is the custom in old-school practice to provoke a movement of the bowels on the second or third day, and, to bring it about, recourse is generally had to cathartics of

various kinds. This we cannot but regard with disfavor, both in respect to the time of movement, and the mode of eliciting it.

In the latter days, or hours, of pregnancy, there is generally a relaxed state of the bowels. When this is not true, an enema should be given in the early part of labor, and the rectum entirely emptied. This having been done, there is no crying necessity for further action during the succeeding four or five days, unless ineffectual desire is sooner manifested. On the fourth or fifth day a few doses of *nux vomica* may be given, and, if necessary, a full enema of tepid water and soap. If there is earlier desire, without favorable result, it will be wise, in the absence of inflammatory complications, to give a small enema. If the woman has been, or is, suffering from inflammatory action in the pelvic region, the regulation of the bowels will require most careful attention.

In exceptional cases the bowels are diarrhœic after delivery, the treatment of which condition will be but little modified by the puerperal state.

Time for Getting Up.—Many women claim to feel as well, and almost as strong, immediately after labor as before, and it is impossible to impress them with the necessity for keeping the bed eight or ten days. It should be remembered, however, that this question of rest is the most important one in connection with either normal or abnormal lying-in. The experience of the laboring women of foreign birth, who generally get about on the third or fourth day, is pointed to by some as evidence of the harmlessness of the practice of early rising from the puerperal bed. We admit that it is not so much the danger of immediately serious effects that we fear in such cases, as the weakness and derangements which are apt to ensue, and torture the patient for long months or years. And when we have an intimate acquaintance with the physical condition of those who disregard physiological laws respecting the lying-in state, whatever the nationality, we find that they are laden with ailments, and bear about with them the evil effects of their indiscretions.

Still, the habit of keeping the woman on her back for a week or two following parturition, is a very injurious one. She should be allowed to sit upright to urinate and defecate, and by this means all coagula and retained lochia will escape from the vagina through force of gravity.

During the first few days the puerperal woman should be kept quiet, and free from annoyance. No garrulous neighbor should be permitted to disturb her repose of mind and body. She will do well to keep her bed for nine or ten days, no matter how strong or well she may feel; and for at least a week subsequently, more than half her time should be spent in a recumbent posture. If she will contentedly remain longer, so much the better, provided the nurse give her massage, as the normal post-partum changes will be more satisfactorily accomplished. In considering the question of rest after delivery, the fact that the uterus does not complete its involution under six or eight weeks, should be kept prominently in mind; and it ought to be remembered that an early getting up is harmful largely because it interferes with the prompt and full accomplishment of this physiological process.

There is but a single further caution to be offered in this connection, and that is to observe special care in the instance of feeble, nervous women, not to permit them to lie in bed too long. Some women require verily to be driven out of bed. Every little discomfort is magnified, and made a pretext for acting the part of an invalid. The management of such cases requires the most consummate discretion and tact.

The temperature of the room in which the child is to be washed and dressed should not be below eighty degrees; and as the comfort and well-being of the mother are not compatible with so great heat, these attentions should be given in another room.

At the time of birth the child is covered with a layer, more or less thick, of *vernix caseosa,* which cannot be easily removed without first being treated to a thorough application of oil or lard. The bath should not be prolonged, and, at its close, the infant should be wrapped up warmly and laid aside for a time, or completely dressed.

The condition of the navel after separation of the cord will depend in some measure upon the treatment of the cord at the time of birth. It is the practice of a goodly number of able practitioners to await cessation of pulsation in the cord, or not, and then sever it without applying a ligature. That the practice, if properly followed, is a safe one, we are fully satisfied from considerable experience. The cord should be held between the thumb and fingers and cut with a pair of blunt scissors. If bleeding follows, the stump should be held for a moment, and

then stripped between the fingers. As soon as bleeding has once ceased, the child may be considered safe. Still, like those cases wherein ligation is practiced, it is wise to examine the stump occasionally during the first half hour. While we do not recommend this innovation, we can see no rational objection to it. We have no question that it is more in accordance with physiological conditions, and is less liable to be followed by umbilical irritation and ulceration.

When the child is being dressed, the stump of the cord should be rolled in antiseptic cotton, or laid between folds of iodoform gauze, and then covered with the band.

Should the navel become inflamed, or severely irritated, we must enjoin perfect cleanliness, to be practiced without friction, and the application, if necessary, of iodoform or boracic acid.

The child will require no nourishment but that which it derives from the maternal breasts. The early secretion—colostrum—has a laxative effect on the child's bowels, while at the same time it affords some nourishment. It is advisable, as a rule, to put the infant to the breast early, not only for its own benefit, but also for the good of the mother.

In those unfortunate cases where the mother is unable to nurse her child, or it is thought inadvisable for her to do so, we have to provide either a wet nurse, or an artificial diet. A discussion of this subject we shall omit, and refer the student to special treatises on the subject, and to works on diseases of children.

CHAPTER II.

THE PUERPERAL DISEASES.

Phlegmasia Alba Dolens—*Milk Leg.*—The following account of this painful disease has been taken from a joint report on the subject made to The American Institute of Homœopathy in 1889, the etiology, symptomatology, diagnosis and prognosis being from the pen of Prof. L. L. Danforth, M.D., and the treatment from that of C. G. Higbee, M.D.

"The term Phlegmasia Alba Dolens has been employed to express a certain condition of the lower extremities observed most frequently in puerperæ, but not wholly confined to them. This double title signifies, etymologically, a *painful white swelling* (inflammatory in character), and neither designates nor implies any information with regard to the chief etiological or pathological factors involved. It simply defines the disease in its essential features. In order that we may study the affection from a nosographic point of view, this title merits preservation in medical nomenclature, for the present at least, with its primitive acceptation.

"*Etiology.*—The theories which have been held from the earliest times with regard to the causation of this affection have been various, and, as is usual in the study of diseases which have been imperfectly understood, they have been as fanciful as numerous. Etiology has concerned investigation less than pathology. The trend of research has been toward the nature of the morbid processes in the affected part rather than towards the influences which have produced those processes. That we may ascertain the nature of the active forces which produce the *ensemble* of local phenomena which we designate phlegmasia alba dolens, it will be necessary to refer briefly, and in a very general way, to some of the most marked pathological conditions observed in this disease. This we do in order to define it in its essential features, and to trace, if possible, from this grouping of morbid processes, the predisposing and proximate causes. In this we shall endeavor to avoid encroaching upon the province of the writer to whom pathology has been especially referred.

"Mauriceau, one of the first to write intelligently on this subject, attributed the disease to 'a reflux on the part of cer-

tain noxious humors that should have been evacuated by the lochia.'

"Puzos gave a tolerably complete description of the disease, but considered it a sort of milk deposit, due to the arrest of the secretion of the milk, and its extravasation into the affected limb. Hence the term *œdema lacteum* and *milk leg*, by which the disease was and still is designated by many at the present time, particularly among the laity.

"Mr. White, of Manchester, England, believed that 'the proximate cause was an obstruction, detention, and accumulation of lymph in the limb; that the disease was local and had a local cause; that the obstruction was occasioned by some accident happening during the time of labor, or some state peculiar to childhood.' This accident he believed to be the pressure of the child's head upon one or more lymphatic vessels to such an extent as to stop the progress of the lymph, and the vessel, being surcharged, at last bursts and sheds its contents. The lymph stagnating outside the vessels was, in his opinion, the cause of the symptoms.

"Tyre, of Gloucester, maintained that the disease was an *inflammation* of the femoral and inguinal glands, due to *pressure during labor*, or to the absorption of poisonous discharges from the vagina, or to inflammation commencing in a lymphatic vessel and spreading upwards to its proper gland. The changes thus produced in the gland prevented the passage of fluid through it, and effusion into the cellular structure of the limb followed. (Ramsbotham.)

"Dr. David Davis contended that the phlegmasia dolens depended on inflammation of the coats of the iliac and femoral veins, and in support of his essay presented the result of a dissection of the veins in a fatal case in which the veins were found filled with coagula. This gave rise to the *phlebitic theory*, which was substantiated and rendered even more positive by the researches of M. Bouillard, 'which demonstrated that the femoral veins were diseased to a considerable extent, and their canals partially or wholly obliterated.'

"Dr. Robert Lee, in 1823 (Ramsbotham), traced the inflammation into the uterine branches of the hypogastric veins. He believes that the disease was a true phlebitis, which began in the uterine veins, and thence extending, by continuity of tissue, to the common iliac, external iliac, crural and femoral veins. The comparative frequency of the affection in the puerperal

state Dr. Lee believed due to the open condition of the orifices of the uterine veins, at the moment of separation of the placenta, whereby 'a communication is indirectly established between the venous system and the atmospheric air in a manner somewhat analogous to what takes place in amputations and other extensive wounds.'

"The researches of Lee and Davis placed the *phlebitic theory* on a strong foundation and the name '*crural phlebitis*' has been extensively adopted instead of phlegmasia dolens. The inflammatory theory was very generally received. Of late years, however, it has been indisputably shown by pathologists that the thrombus, which was always present to a greater or lesser degree, 'was by no means necessarily, or even generally, the *result* of inflammation of the vessels in which the clot was contained, but that the inflammation was the result of the coagulum.' (Playfair.) In the search for the true cause of phlegmasia dolens, and to prove or disprove the phlebitic theory, investigations were made, especially by Henry Lee (1852), which showed that it was very difficult to cause inflammation of veins by any irritant acting directly upon their lining membrane; that irritants act by causing the blood to coagulate in the veins.

"Dr. Mackenzie (1861), of London, made most valuable contributions to our positive knowledge of this subject. He proved most conclusively, that 'inflammation of the veins in a pure and uncomplicated form cannot give rise to all the local and general phenomena of the disease, and cannot therefore be its proximate cause; and furthermore, that phlebitis itself is for the most part not a primary, but a secondary affection, and in the great majority of cases is a consequence of the circulation of impure or morbid blood in the veins.'

"The condition which predisposes to phlebitis is familiarly known as *hyperinosis*, or a state characterized by an excess of fibrin (or *fibrinogen*—fibrin-producing materials), and other extractive matters in the blood. This is the peculiar alteration of the blood observed in the cachexias and in pregnancy, as pointed out by the hæmatologists Andral and Gavarret. It consists in a change in the proportion of the elements of the blood. There is an excess in the amount of fibrin and serum and a deficiency of the blood-corpuscles, as compared with the normal state. In this condition of the blood there is a special predisposition to coagulation, which has been denominated *inopexia* (fibrin coagulation). When this tendency exists and

the circulation is blocked by the formation of a clot in the vein, we have, as is well known, the formation of a *thrombus*. It is now known positively that the tendency to coagulation and thrombus formation is a constant phenomenon of phlegmasia alba dolens, and the other diseases characterized by occlusion of the peripheral veins. Here, then, is a predisposing factor of great importance in the production of this disease. But *thrombus* formation alone is not phlegmasia alba dolens. We have already ascertained that inflammation of the veins is the result of the coagulation within them; that the coagulum is the primary factor, and that the inflammation is secondary thereto. The extent and severity of the phlebitis is variable in different cases.

"Fordyce Barker maintains that phlebitis and phlegmasia alba dolens are separate and distinct affections. He refers to the number of cases of well-marked phlegmasia dolens, as reported by numerous observers, in which death occurred, and the veins were found perfectly healthy—devoid of inflammation—notwithstanding the presence of the thrombus, as proof of the non-identity of the two affections. It would seem, however, in the light of more recent investigations, as if the difference was one of degree rather than of kind. But thrombus formation with or without phlebitis does not constitute, pathologically, all of phlegmasia dolens. The lymph channels are also affected, as evidenced by the enlargement of these structures, as well as the lymphatic glands, all of which are in many cases matted together by connective tissue. The exudation of coagulable lymph when the part is pricked by a needle, the peculiar white, hard swelling of the limb, all tend to show that the lymphatics are choked, and can no longer perform their functions.

"Dr. Tilbury Fox believes that obstruction of the main lymphatic channels is alone capable of giving rise to 'white leg,' and acts by preventing the removal of lymph from the affected limb. The obstruction in the lymph channels he believes may be the result of extensive pressure from tumors, thrombosis due to rapid compensatory absorption of morbid fluid, after sudden loss of any kind, or to inflammatory changes in the vessels themselves. It is unnecessary to pursue farther the study of the pathological processes present in this disease. By so doing we should be overstepping the limits which have been assigned us. We have brought forward the ideas of

different authors to show, *first*, the great discrepancy of opinion which has existed in times past with regard to the true nature of this affection; *secondly*, to express the belief that there is an element of truth in all the above theories.

"It is certain that venous obstruction and phlebitis exist, although they are secondary or tertiary features; that there is also engorgement of the lymphatics is now abundantly proven. If we interpret the theory of 'suppression of the lochia' and 'metastasis of milk' as implying arrest of secretion and excretion, and therefore the arrest of noxious material in the blood, we recognize another true factor.

"The old pathology of the disease, as enunciated by Mauriceau and Puzos, was not, after all, so far from the truth. Their guess at the causes of the disease was more happy than the speculations of their successors. The old idea of poisonous material in the blood is, at the present day, included in the definition of the modern term, *hyperinosis*.

"Having shown what the disease is in its essential features, it remains for us to seek the causes—predisposing and proximate—which are capable of producing such a striking combination of local and general symptoms.

"Among predisposing causes, conditions which favor blood coagulation are most important. This has been discussed sufficiently in the foregoing under the head of hyperinosis of the blood. But here we may very appropriately point out some accidents and complications of the puerperal state which have an important influence in increasing the tendency to blood coagulation in the venous system. One of the principal of these is *hemorrhage*, occurring either before, during, or after labor. Blood loss is always followed by increase of fibrin in the blood retained, and increase of fibrin favors coagulation. Again, *feebleness of the blood current*, whether from exhaustion following a tedious labor, or from hemorrhage, or from debility due to previous disease, favors coagulation. Great feebleness of the circulation, without syncope, may produce it.

"Some of the worst cases arise from *septic infection*. In addition to the state of the blood in pregnancy, disease-producing germs are introduced from without, blood contamination occurs, and local inflammations result, involving veins and lymphatics, or the altered state of the blood may primarily produce coagulation in the veins.

"Dr. Tyler Smith pointed out an occasional analogy between

the causes of phlegmasia dolens and puerperal fever, evidently recognizing the dependence of the former on blood dyscrasia. 'I believe,' he says, 'that contagion and infection play a very important part in the production of the disease.' In view of this he narrates the following instructive history: 'A short time ago a friend of mine had been in close attendance on a patient dying of erysipelatous sore throat, with sloughing, and was himself affected with sore throat. Under these circumstances he attended, within the space of twenty-four hours, three ladies in their confinements, all of whom were attacked with phlegmasia dolens.' There is no doubt, at the present day, of the influence of septic infection in the production of this as well as other local inflammations, all of which may very properly be classified under the head of *puerperal septicæmia.*

"A recognition of this fact should have an important influence in regulating the practice of midwifery, so that this and other diseases of the puerperal period, which are dependent upon sepsis, may be reduced to the minimum.

"Among the *immediate* causes may be enumerated those accidents and complications of delivery which render manual and instrumental means necessary to effect delivery. Thus the disease is apt to occur after placenta prævia, or after manual extraction of the placenta, inflammations about the pelvis following difficult obstetrical operations, complicated labors, multiparity, etc. In all these conditions the starting-point is an inflammatory process in the pelvic venous and lymphatic systems. In most cases, probably, a pre-existing lesion of the vein is the pathogenic cause, which arises from vitiated nutrition, cachexia, or some severe febrile condition. Another cause is the detachment of coagula from placental site, and lodgment in the crural veins, the clot or fragment having been floated along in the blood current.

"*Symptoms.*—We shall describe two forms of the disease. The first is comparatively simple and free from danger. The *second* we shall call the *infectious type.* This is characterized by a marked dyscrasia, and is commonly fatal.

I. THE SIMPLE FORM.

"This disease is one of the later morbid manifestations of the puerperal month. The period of greatest danger to the recently confined (from the third to the fifth day) may have passed without untoward symptoms.

"Suddenly, generally from the tenth to the twentieth day, the patient complains of *pain* either in the calf of the leg, the popliteal space, the thigh along the track of the femoral vein, or its principal branches. Sometimes the local symptom is preceded or accompanied by slight rigors, soon followed by an elevation of temperature to 100° F., and even to 103° or 104°; the pulse increases with the temperature. Profuse perspirations; a general condition of malaise and depression; loss of appetite; furred tongue; pale face, and anxious countenance, are among the constitutional symptoms of the disease. In a few cases the local symptoms are unaccompanied by indications of constitutional disturbance.

"The function of lactation is generally very much impaired, and sometimes wholly arrested, by the development of the disease. The lochial discharge seems, in many cases, to be very little influenced by the onset and progress of the disease, but in others it has been observed to become very fœtid and offensive. With regard to the affected limb, it is usually the *left* which first becomes involved. Both legs may become affected, but it is never developed in the two simultaneously, although the interval between the involvement of the two legs is sometimes very short. The swelling, which soon follows the pain, extends from above downwards. This is a constant and one of the most prominent features of the disease. Trousseau declares that he has never seen the swelling progress in this direction (from above downwards), but that it always begins at the lower extremity and ascends towards the pelvis.

"Prof. Barker is in accord with Bouchut and some others that neither assertion is absolutely correct, but that in some cases the swelling begins below and advances upwards, while in other cases the reverse occurs. Swelling is generally very marked, and the limb becomes twice its normal size. The skin is tense, of a glistening, shiny white aspect, and there is usually hyperæsthesia of the surface. The swelling of the limb is unlike that of ordinary œdema. There is a sense of resistance on pressure quite different from the doughy feel of œdema, and there is not the pitting under pressure so characteristic of œdema; the impression made is quickly removed. Loss of all muscular power, complete immobility of the limb, is another characteristic of the disease. This is partly due to the pressure upon the nerves by the effusion, and partly to intra-pelvic complications. The patient cannot move the limb in bed; some-

times there is loss of sensation, a *wooden feeling* in the limb. The enlarged cord-like sensitive veins may be seen and felt in some cases; in others the most careful examination will fail to detect any such cords. Pain is produced by pressure in the groin and in the buttocks and thighs. Puncture of the tense white skin causes a drop of fluid to exude, which is thicker than serum and quickly coagulates. This fluid contains coagulable lymph, which the obstructed lymphatics could not carry off.

"Internal examination of the pelvis will frequently reveal the complication with perimetritis, the constituents of the broad ligaments being the seat of inflammatory effusions.

II. THE MALIGNANT OR INFECTIOUS FORM.

"This form varies only in degree from that which has just been described. Robert Barnes says of this variety: 'When in subjects much depressed by previous illness, bearing some diathetic taint, who are reduced by hemorrhage and protracted labor, septic stuff capable of exciting thrombosis in fairly healthy subjects enters the uterine veins and lymphatics. The attempt to shut out the enemy by clothing does not succeed. The clots formed are soft, imperfect; the phlegmasia and lymphangitis spread; suppuration takes place; abscesses form in the perimetrium, or in the course of the femoral and iliac veins; the whole mass of the blood is invaded and further degraded. In this form the localizing power is lost; the poison breaks bounds; it pervades every tissue in the body, and distant suppurations may occur; it undergoes a change, partly chemical, partly necrotic. The course of these cases, to which the term "suppurative phlebitis and lymphangitis" of Cruveilhier would apply, is rapidly fatal. It is seen most characteristically in lying-in hospitals, or in that most disastrous conjunction, a lying-in ward in a general hospital.'

"The disease is marked by sudden onset, high temperature, 104° or 105° F., and rapid pulse, from 140 to 150 per minute. Great prostration, rapidly assuming a typhoid type; delirium is a forerunner of death. Inflammatory affections of joints, ending in effusion of serous or sanious fluids, or pus is sometimes met with.

"*Diagnosis.*—The diagnosis of this affection is not difficult. The characteristic symptoms are so marked that they can scarcely be mistaken for those of any other affection. The sudden onset, the local pains, swelling, color of the skin,

immobility, evidences of venous inflammation, as shown by local tenderness and redness, and the involvement of internal veins, all point to venous thrombosis and lymphatic engorgement.

"*Prognosis.*—In its simple form the disease usually terminates in recovery, although a favorable progress is sometimes suddenly checked by an accession of new symptoms, as well as a repetition of those observed early in the disease. These symptoms mark a fresh absorption of poisonous elements into the blood. The fever and more urgent local signs commonly subside in from one to two weeks. Swelling and impaired mobility last for some time longer. A degree of paralysis may last for several weeks. The whole process requires from a month to six weeks before complete recovery takes place. The absorption of the effused lymph and serum and fibrous deposit takes time. The liability to detachment of fragments of the coagulum, the formation of an embolus, which may cause sudden death by occlusion of the pulmonary artery, should not be forgotten.

"The prognosis of the *septic form* is very grave. Death commonly results. If the patient escape the immediate effects of the blood empoisonment, there is greater danger of embolism than in the simple form, on account of the marked blood dyscrasia.

"TREATMENT.—In consulting, as I have, quite a large number of books and journals in relation to the above subject, I am astonished at the small number of authors who have written upon obstetrics and gynæcology, who do anything more than refer to the disease in brief paragraphs. Some who mention it and speak of the uncertain pathology, give no treatment whatever. Others recommend treatment so irrational that no intelligent physician of the present day would think of recommending it. As it is conceded that the disease usually occurs in patients who are weakened by some other disease, the fallacy of the old practice of bleeding is apparent. Blisters, too, though more rational, by no means do as much good as harm. The swelling and congestion may produce an anæsthesia in the peripheral nerves, so that a blister will do great harm before it is felt.

"The embrocations recommended by old-school authors were numerous, and no doubt useful in many cases.

"I believe the best authorities agree that the disease is of

septic origin. To us this would give the key to the curative remedies. While we have a long list for the relief of the most *prominent* symptoms, there are but few that correspond to all the manifestations of the disease. I think that in this disease, as in some others, the best treatment is that administered before they are attacked; in other words, prophylactic. I find that many homœopathic physicians have never had a case, and others very few. This corresponds with my individual experience. As we have under consideration only those cases that arise during the puerperium, our recommendation will apply only to such cases.

"As prophylactic, we should have our patients under supervision during the whole period of gestation, and promptly check any departure from health at its onset. We should recommend such exercise in the open air as each can bear. This will give tone and strength to the muscles and nerves, that is so much needed at the time of confinement. Sitz baths taken every day, followed by gentle friction, are useful in equalizing the circulation and preventing congestions. If there is nervousness and dread of the approaching crisis, *gelsemium*, given in the evening, will quiet the apprehension and induce sleep if there is insomnia.

"If there is excessive pressure upon the superficial veins, bathe the parts with a lotion composed of *arnica tincture*, *oil of sweet almonds* and *alcohol*. In applying any external application, rub from the extremities towards the heart. These are the requisite means to use before confinement.

"A few years ago I attended a lady in confinement, and left her in charge of my assistant while I went away from home to attend a meeting of this Institute. I had met the lady only once previous to the call for labor, and knew but little of her condition. About the end of the first week after confinement she was attacked with the first symptoms of phlegmasia, and it soon developed into a severe case. In answer to telegrams, I hastened home and had the satisfaction of conducting the case to a successful issue. In two subsequent confinements she had prophylactic treatment and no phlegmasia.

"During labor every possible means should be used to prevent laceration of any of the organs involved, and to secure immediate contraction of the uterus after removal of the placenta, thus diminishing to the minimum the danger of absorption of septic poison or germs.

"Corresponding to all the indications after successful delivery, we know of no other remedy equal to *arnica*. It will do as much as any other to relieve the overtaxed muscles and soothe the nerves.

"In case of lacerations, whether or not an operation has been necessary, *arnica* is still indicated. If septic absorption is feared, *arsenicum album* should also be given from the time of confinement. If premonitory pains are felt in the uterus and leg, the utmost care should be taken to secure rest, both physical and mental. The leg should be slightly raised and supported evenly, and be gently bathed with a solution of *hamamelis*.

"The leg and foot should be kept warm, even to perspiration. If fever ensue, *aconite* should be given in place of *arsenicum*. *Hamamelis* internally will also prove a valuable remedy. If, in defiance of all this treatment, the disease progresses, and the pain, swelling and fever increase, the leg may be enveloped in a thick layer of cotton batting, or wrapped in flannels wrung out of hot water, and frequently changed. Other remedies will have to be used as the symptoms change. *Belladonna, rhus toxicodendron, apis, veratrum viride*, in addition to those above mentioned, will be at times useful. From the hour of delivery antiseptic vaginal injections should be used. Beef tea and wine will be needed to support the system until the crisis is past.

"As soon as the inflammation subsides, bandage the leg evenly from the foot to the thigh.

"If abscesses form in the inguinal glands or along the course of the lymphatics, freely open them and wash out the cavity with carbolized calendula water. To prevent the disease extending from one side to the other, the patient should avoid any strain upon the leg not affected, and it should be frequently rubbed to promote circulation in the superficial veins.

"If embolism develops, and the clots are transmitted to the heart or brain, a fatal termination is probable, and no remedies will avail."

CHAPTER III.

THE PUERPERAL DISEASES—Continued.

Sudden Death During Labor and the Puerperal State.—Death sometimes occurs suddenly during labor and in the puerperal state, and may be attributed to a variety of causes, among which the following stand most prominent:

PULMONARY THROMBOSIS AND EMBOLISM.—As we have before stated, the blood of a puerperal patient is in a hyperinotic state, and to that condition is justly ascribed the strong disposition to coagulation which has been observed. "In all the accidents and anxieties of obstetric practice," says Meadows, "none can compare with the shock of the sudden death due to pulmonary thrombosis. A patient, apparently convalescing happily, is struck down with scarcely a moment's warning."

This accident is sometimes due to detachment of vegetations from the cardiac valves, but oftener, as has been intimated, to a general blood dyscrasia, which predisposes to coagulation. A clot may form on the right side of the heart, and extend to the pulmonary artery, the coagulation, it is said, taking place suddenly. The patient appears to be doing well, when upon making some exertion, it may be but raising the head, profound dyspnœa is suddenly developed, accompanied by most frantic efforts to breathe, and the utterance of faint cries, soon followed by syncope and death. It is liable to occur not only during the period immediately succeeding delivery, but even after the woman has begun to walk about.

It is plain that but little room is given for treatment in such desperate cases. About all that can be done is to keep the patient as quiet as possible, and if life be prolonged, with chance for recovery, stimulants should be carefully exhibited.

SYNCOPE.—After excessive loss of blood, the heart, under the strain of sudden exertion, is liable utterly to fail. In such cases death takes place almost instantaneously. For days, and, in extraordinary cases, for weeks after delivery, it is advisable to keep women who have suffered from exhausting hemorrhages under the greatest restraint, as a very slight over-exertion is in some instances fatal.

Whenever a woman faints in the puerperal state it is highly

important that she be relieved as speedily as possible, for there is here a double danger—that of utter cardiac failure, and that of retardation of the circulatory currents giving rise to coagulation of blood, and the occurrence of fatal thrombosis or embolism. We should indulge in the free use of diffusible stimulants, and the immediate application of a sinapism to the precordial region.

A remedy may be selected from among the following:

Pulsatilla.—This mild remedy acts nicely when the patient is of a mild, tearful disposition, and has shown great sensitiveness to every impression.

Veratrum alb.—When the attacks come on suddenly and are repeated on the least exertion. Coldness of the extremities.

China.—Especially if there has been much loss of blood. It is a good remedy, however, when there has been no unusual blood loss, but there is low vitality, weak digestion and sensitiveness to the cold.

Phosphoric acid.—This remedy is especially serviceable when the woman has been in poor health for some time prior to labor, and is of a weak, nervous, brainy organization.

Amyl nit. by inhalation should be thought of as an early aid, and its good effects may be prolonged through administration by the mouth.

Cactus grand. is especially of use when there is great sensitiveness of the nervous system, weak digestion and tendency to palpitation of the heart.

Digitalis stands forth prominently as one of the most useful remedies whenever there is weak cardiac impulse. We purposely refrain from putting it early in the list, as its use has become routine, and we believe much better effects may be obtained from remedies indicated by particular symptoms.

ENTRANCE OF AIR INTO THE VEINS.—McClintock cites six cases in which death appeared to be due to the entrance of air into the veins. Madame Lachapelle mentions two, and others have been reported. When firm uterine contractions do not follow delivery, the uterine sinuses are left in a condition favorable to the entrance of atmospheric air. In one of Madame Lachapelle's cases it was found that the "uterine sinuses opened into the interior of the uterus by large orifices through which air could readily be blown as far as the iliac veins, and vice versa." The very action of the uterus itself in contracting and expanding, would have a tendency to draw air into the

sinuses, since, at the moment of expansion, relaxation of the vessels and the entrance of a certain amount of air into the uterine cavity are coincident occurrences.

Pathologists are not in accord with regard to the cause of death in these cases. The reasonable theory is that of Virchow, Oppolzer and Feltz, which refers the fatal result to impaction of air globules in the lesser divisions of the pulmonary arteries, where they constitute gaseous emboli, and produce death in the same manner as the fibrinous emboli. To this cause we may probably justly refer a considerable proportion of all cases in which sudden death occurs soon after delivery. The symptoms do not correspond to those of shock as ordinarily manifested.

VIOLENT EMOTIONS.—Violent emotions of grief, fear and anger are responsible for a small percentage of sudden deaths during the puerperium.

It is possible that, in some cases, timely relief may be afforded by our remedies; but death in these instances is often instantaneous.

Colocynthis.—Complaints arising from anger. (Also *staphisagria, belladonna, ignatia, chamomilla, cistus* and *platina.*)

Gelsemium.—After bad news.

Aconite.—After fright. (Also *ignatia, opium, belladonna, coffea, lachesis* and *pulsatilla.*)

Ignatia.—After grief. (Also *phosphoric acid, aconite, staphisagria, colocynth, lachesis.*)

ORGANIC HEART LESIONS, recognized or unrecognized, are among the common causes of sudden death during the puerperal state.

Defective Lacteal Secretion.—Many women, especially those who possess a nervous temperament and are poorly nourished, are annoyed by having an insufficient quantity of milk to supply their babes.

We believe the practice adopted by some physicians, who recommend the use of alcoholic stimulants in some form for the purpose of overcoming this embarrassment, is pernicious to both mother and child. Outside of the suitable homœopathic remedy, our main reliance in such cases must be a sufficiency of good nutritious food, especially such as contains phosphatic elements. Yet such mothers should never eat to repletion under the stimulus of a desire to provide nourishment for their young, as the result of such a practice is almost sure to be unpleasant.

The article of food which in our experience has proved the most satisfactory, is fresh milk. Women of delicate nervous organization will sometimes thrive on it, while at the same time their supply of milk is greatly augmented. In exceptional cases it does not agree.

The remedies most useful to increase the lacteal secretion are the following:

Scanty secretion, with despairing sadness: *agnus cast.*

Deficiency of milk, with over-sensitiveness: *asafœtida.*

Scanty secretion of milk: *bryonia.*

Scanty secretion of milk in women of a scrofulous diathesis: *calcarea carb.*

Mammæ distended, but milk scanty: *calcarea carb.*

Little milk, in mild tearful women in apparent health: *pulsatilla.*

Milk scanty or vitiated; child refuses it: *mercurius.*

Scanty milk, with debility and great apathy: *phos. ac.*

Lack of milk, with much stinging in the mammæ: *secale.*

Insufficiency, or entire lack of milk after parturition: *urtica urens.*

We often effect most good in these cases when we direct our remedies against the constitutional dyscrasiæ observed in our patients.

Depressed Nipples.—When the nipples, instead of being prominent and full, are depressed, or retracted, the child experiences the utmost difficulty in nursing, and on this account may, from the start, utterly reject the breast.

In some of these cases the depression is due to anatomical defects, and cannot be overcome; but in others it is the result of pressure, and by manipulation and suction it is soon sufficiently overcome for functional purposes. If the defect cannot be remedied, a glass nipple shield, with rubber tube, will often afford a satisfactory medium through which the child may nurse.

Excessive Lacteal Secretion.—This is known as *galactorrhœa*, and sometimes seriously interferes with successful lactation. It is not alone women of robust constitution who are the subjects of excessive secretion of milk, but the weak and delicate as well, in whom, of course, it is a condition of greater import. In the former the secretion may be wholesome, but in the latter it is generally watery and innutritious, and, unless the morbid condition be corrected, serious effects upon the

health are likely to be produced. The woman begins to suffer from weakness, emaciation, insomnia, headache, and a host of other unpleasant symptoms, and is finally forced to relinquish nursing.

Galactorrhœa is in a measure under the control of remedies, and the effect of these should be tried before depriving the infant of the maternal breast. Those from which the greatest benefit is likely to be derived are, *calcarea carb.*, *uranium*, *pulsatilla* and *phytolacca*.

If the mother is unwilling to wean her child, certain remedies may be administered with salutary effect on her physical condition. For the general weakness and prostration which she suffers, *china*, *calcarea phos.*, *phosphoric acid*, and *carbo veg.* are the most useful.

The following remedies may aid in correcting the quality of the secretion:

Calcarea phos.—Milk watery, and the woman of a phthisical build.

Lachesis.—Milk thin and blue and the patient sad and despairing on awaking.

Acetic acid.—Milk impoverished, bluish, of strong sour odor and taste.

Arsenicum.—Milk poor in quality and the woman fleshy.

Sulphur.—In poorly nourished, low-spirited women, who complain of frequent weak faint spells.

Calcarea carb.—Poor milk, though profuse in quantity, in women of a lymphatic temperament.

Sore Nipples.—In the early days of lactation, women are often tormented with erosions, excoriations, chaps, fissures and cracks of the nipple, giving rise in many cases to most intolerable suffering. The trouble generally begins with simple erosion, but may go on from bad to worse, only to terminate in mammary abscess.

The affection is caused mainly by friction of the child's mouth in nursing, and may be obviated by suitable care of the nipples both before labor and during lactation. Cazeaux regards the exposure of the nipples to cold, while warm and moist, as one of the most frequent causes of the trouble. When the soreness is developed subsequently to the tenth day after delivery, it is generally due either to biting by the child, or the communication to the nipples of an aphthous inflammation.

When fissures have been formed, the irritation may be trans-

mitted from the base of the nipples to the cellular tissue, and eventually to the glandular structure itself. It constitutes a frequent cause of mastitis.

Treatment should be largely of a prophylactic nature. During the latter months of pregnancy, the delicate skin, covering the nipple, may be hardened by the frequent application of astringent lotions, like strong tea and tannin. Such precautions are particularly appropriate to primiparæ. When lactation begins, the nipples ought always to be sponged off with warm water after nursing, and gently dried, as the secretions of the child's mouth, if left, are capable of causing considerable irritation. Should erosion be set up, and refuse to yield promptly to the measures adopted, the child should be made to nurse for a time through a shield. When cracks and fissures exist, it may be necessary in some cases to touch the raw surfaces once or twice with nitrate of silver, or strong carbolic acid.

Of local applications we regard *hydrastis* as among the best. The nipple should be washed and dried, after which the "fluid" hydrastis may be applied and allowed to remain until another nursing.

We have found *cocaine* useful in a few cases, not only to relieve the pain of nursing, but also to heal the abrasions.

In sore nipples the woman often finds a relentless foe, and the physician is driven from one expedient to another in hope of giving relief.

M. J. Blechmann advises the treatment of cracked or fissured nipples by means of goldbeaters' skin. Over the nipple affected, after wetting with simple clean water, there is applied a round piece of goldbeaters' skin, of about ten centimeters in diameter. The center of the skin is first pierced by a number of fine holes with a needle. The skin takes the form of the nipple and adheres like a second epidermis. The external surface of the goldbeaters' skin may now be moistened and the infant applied to the breast. The nipple is thus isolated from the child's mouth, and has a chance to heal without suffering the constant irritation from contact with the lips of the infant. After each nursing, a new piece of skin should be applied.

When the crack is across the summit of the nipple we have sometimes succeeded by carefully filling it alone with dissolved gutta percha tissue.

The following remedies, when administered on the strength of the indications given, will in many cases, with or without the use of adjuvants, be adequate to overcome the difficulty:

Nipples itch, burn, look red: *agaricus.*

Nipples sore from nursing: *argentum nit.*

Nipples ulcerated: *calcarea carb.*

Nipples ache, and feel sore: *calcarea phos.*

Nipples nearly ulcerated off, in neglected cases: *castor equ.*

Nipples bleed much, and are very sore: *lycopodium.*

Nipples feel very raw and sore: *mercurius.*

Nipples ulcerate easily, and are very sore and tender: *causticum.*

Nipples inflamed and very sensitive: *chamomilla.*

Nipples dark, brownish red; unbearable pain on slightest touch; breasts full, skin hot, pulse strong: *colchicum.*

Nipples very sore to the touch; pain from nipple to scapula of same side whenever the child nurses: *croton tig.*

Nipples painful, inflamed, cracked: *graphites.*

Nipples very sensitive, will not bear contact with the clothing: *helonias.*

Nipples sore, fissured, or covered with scurf; bleed easily: *lycopodium.*

Nipples itch, and have a mealy covering: *petroleum.*

Nipples very sensitive: *phytolacca.*

Nipples sore and fissured, with intense suffering on putting the child to the breast; pain seems to start from the nipple and radiate over the whole body: *phytolacca.*

Nipples sore to touch, and sore and painful spot under right nipple: *sanguinaria can.*

Nipples are sore; they itch and bleed: *sepia.*

Nipples cracked across the crown: *sepia.*

Nipples drawn in like a funnel: *silicea.*

Nipples cracked; after nursing they burn and bleed: *sulphur.*

Nipples painful during nursing, though there is but little appearance of soreness: *nux vom.*

Nipples in the first days of nursing feel sore as if bruised: *arnica.*

Mastitis Puerperalis.—We have here laid tribute upon a report made to the American Institute of Homœopathy, in 1889, by the following honored members of our school:

J. B. G. Custis, M.D., Etiology and Symptomatology of Mastitis.

Wm. C. Dake, M.D., Pathology of Mastitis.

J. Nicholas Mitchell, M.D., Treatment of Mastitis.

"ETIOLOGY AND SYMPTOMATOLOGY.—Upon first receiving this subject from our worthy chairman I drew a long sigh, thinking that I had been assigned one of such magnitude and intricacy that I could treat it satisfactorily only by taking the time to consider it under many subdivisions, divided into firstly, secondly, and so on to twelfthly, at least, recounting symptoms by the score, stopping occasionally to pay my respects to a few writers who have neglected the breast proper while groping after some fashionable cause of the fever of their patients, such as malaria, cold, or neglect on the part of a nurse who had not received proper training—but lo! upon looking into the recent literature of the subject, I found that I was far behind, and that our German friends had greatly simplified the matter, claiming that, in the language of one of the latest, 'every case of puerperal mastitis is now known to be due to infection, or, in other words, is caused by *bacteria*.' Or, as another states it, 'puerperal mastitis is secondary to disease of the nipples. These bacteria find their way into the milk either through the ducts or through abrasions or fissures in the nipples, infect the milk, and thence the train of symptoms which I will in part describe. If they enter through the ducts we have a parenchymatous inflammation; if through fissures, the inflammation is of the phlegmonous variety.'

"You will all agree with me as to the simplicity of this theory, and the hints for treatment are so plain and leave so much play for the ingenuity of the physician, that it is with regret that I tell you that I cannot either prove or approve it. The least that we can say of it is, that it is entirely unproved, and until these bacteria inventors or discoverers can offer better results from their treatment, based on their theory, we will hold to the old theory, which is more rational, just as the treatment based on it is more rational, and more in accordance with nature that reveals such wonderful foresight and beneficence in the anatomy and physiology of the breast of woman.

"Would the wisdom which designed that the nipple should have just sufficient obliquity forward and outward, with a slight turn upwards, so that it could be reached by the child in

the most convenient position for itself and the mother, have left the ducts so imperfectly protected that bacteria, even with all their modern improvements, could enter and poison the fluid which is to give life and strength to the offspring, which has been so conspicuously provided for?

"For the sake of those who are not sufficiently progressive to accept this modern etiology, I will consider the condition presented for our study under three general heads.

I. SIMPLE SUBCUTANEOUS INFLAMMATION.

"These cases may be accidental, so far as the puerperal state is concerned. Our observation leads us to believe that over-heating of the patient or of the breast is a common cause. They may or may not be associated with disease of the nipples. The symptoms are those of any small abscess, or of a boil.

"There is very little, if any, constitutional disturbance. It may be located in any part of the gland, but is most frequently found near the nipple. It usually results in suppuration, with discharge through a single opening.

II. PARENCHYMATOUS INFLAMMATION, OR MASTITIS PROPER.

"In this variety the inflammation may be situated in the gland tissue, or in the connective tissue between the lobes of the gland. It may occur at any time during lactation, but is most likely to arise within the first ten days after labor.

"The principal causes are: exposure to cold, mental excitement, or blows upon the breast; but the most common is the retention of milk, whether because of excoriated nipples, inability of the child to empty the breast, or neglect on the part of the nurse. This retained milk causes a general congestion, which, if not relieved, will result in inflammation of the cellular tissue.

"Again, we may have occlusion of some of the milk ducts, which will bring about the same result. Now please note the symptoms, and especially the order of their development.

"First. A feeling of weight and fulness, with slight tenderness of the organ, and increasing difficulty in relieving the breast of milk.

"Second. Pains, shooting, darting, stitching, in any or all directions, especially when the child nurses.

"Third. A slight chill, followed by fever.

"After this we see a redness appear in spots upon the breast.

If not arrested we have suppuration, with enlargement of the gland, and unless the patient's constitutional condition is of the best, fistulæ form, through which there is a discharge of pus and milk, the quantity varying in proportion to the extent of the gland involved, and the length of time taken for the abscess to reach the surface. I believe that in this variety this is the order of appearance of the symptoms in all cases.

"Is this the order of any septic process? The first tangible sign of the septic process is the rigor, while in this form of mastitis, the most common, and that generally referred to, the chill does not come for some hours, often not for some days, after the pain and tenderness. We must still maintain the possibility of such cases resulting entirely from engorged milk ducts. Treatment based on this theory is successful in allaying the inflammation and averting abscess, and it behooves us to combat this condition most vigorously, for, if we are not successful, and the inflammation proceeds to suppuration once, we shall have it repeated, and the fistulous openings referred to above will form.

"I hope that those who follow will tell us how to cure them 'right up.'

III. SUB-MAMMARY INFLAMMATION, OR RETRO-MASTITIS.

"I now ask your attention to this, the last, but most interesting division of the subject.

"This is the form in which the most mistakes are made—mistakes which cause so much suffering to the patient, and so generally issue in the destruction of the function of the organ.

"To understand this condition we must glance at the general anatomy of the breast.

"The gland is supported by two layers of fascia, between which it yields to pressure. While the fascia thus supports, it also firmly unites its several fractures.

"In many cases the fascia forms a synovial bursa at the base of the gland, which bursa separates it from the great pectoral muscle, the sterno-costal cartilages, and the ribs. The tissue has the appearance of foliated laminæ instead of being smooth.

"We recognize here the possibility of an inflammatory condition in any or all of its varied forms. The inflammation is the result of the development of the gland under some abnormal

or unfavorable condition, which may be some more or less pronounced variation from the normal formation of the gland, or it may be cold from undue exposure of the breast.

"My observation leads me to think that inflammation in most of these cases cannot be averted, though it can be controlled.

"The symptoms of this form are very characteristic. Three or four days after confinement the patient is seized with severe rigors and sense of chilliness, with great thirst, dry mouth, and rapid pulse, not unfrequently reaching 140 a minute. The head aches fearfully, as do the limbs also, and pains may be present in the abdomen, due to the rigor. This is followed by a severe hot stage that lasts from two to fourteen hours, and this by a sweating stage that brings speedy and gratifying relief. The patient makes no complaint of the breast.

"At about the same hour the next day the symptoms are repeated, and again on the third day, unless the physician is successful in his efforts to subdue the inflammation. If he is not, the patient, after the second or third chill, begins to complain of the breast, and soon we have the unmistakable signs of mastitis, such as I have described above, which may end in suppuration, in which case the process will be tedious and the time long before the pus reaches the surface.

"If the physician is successful in allaying this first attack of inflammation, and is not especially watchful, the same symptoms will recur after a few days.

"As my time is limited I will not repeat the symptomatology, but only call attention to the fact that many authors consider sub-mammary inflammation to be secondary to disease of the chest, or to a parenchymatous inflammation of the gland. I think this is a mistake; that indeed these are never the primary causes, but on the other hand, when sub-mammary inflammation is neglected or badly treated, it may cause disease of the chest.

"It has been my misfortune to see many cases of this condition, and they have all followed exactly the course of development given above, and you will please note the general similarity of the symptoms to those of malarial or intermittent fever, namely, chill, fever, sweat; with recurrence of chill on the following day at about the same hour.

"I have known this condition to be mistaken for intermittent fever; and because the physician did not examine the breast.

"The patient will not complain of it; in fact, may not complain until after the second or third chill, with its succeeding fever and sweat, though she will say the breasts are tender, 'the result of the fever,' but the seat of inflammation is under the gland, which must be pushed aside and examination be made as far under it as possible, and then we shall discover the seat of the trouble.

"Gentlemen, this is personal experience, and I would emphasize it.

"Not long ago I had a physician send me a message from Michigan, telling me how his patient, whom I was treating for retro-mastitis, contracted malarial fever, of which she did not show a sign.

"In the *N. A. Journal of Homeopathy* for December, 1887, you will find a paper on the 'Malarial Complications of the Puerperal State,' in which the author gives the same symptoms that I have given above for the beginning of retro-mastitis, and tells us how frequently the symptoms of malaria show themselves in connection with the puerperal state, and how it is necessary, if treated successfully, to treat it with *quinine*. His cases under this homeopathic (?) treatment follow just the same course as retro-mastitis does without it; and here again we see the ease with which the two can be confounded. The course is that of malarial symptoms suppressed by *quinine*, and returning at stated periods.

"I do not deny the possibility of malarial poison attacking a woman in the puerperal state, and have called attention to it in another place; though I do doubt the frequency of cases which manifest themselves for the first time during the lying-in period. My experience is that all such cases show a malarial history previous to confinement, and my rule is never to make a diagnosis of 'malarial' until I have carefully eliminated the possibility of retro-mastitis and of septicæmia.

"I will say, in closing, that, if our bacteriologists can find any place for their favorites in mastitis, they must choose this latter form, and must find some other place of entrance for them than through the nipple or possible fissures.

"Other forms of disease of the breast do not belong to us, for the reason that if they occur during the puerperal state they are either secondary, metastatic or accidental as far as the period under consideration is concerned."

PATHOLOGY.—"According to pathologists there are three varieties of inflammation of the mammary gland:

"1st. The subcutaneous;

"2d. The glandular, and

"3d. The sub-glandular.

"1. Of these, the first, or subcutaneous, when not extending into or causing the second, is by far the simplest, the least severe, and the least likely to cause serious trouble. It is usually a simple inflammation of the areolar tissues lying above the gland, and runs, when uncomplicated, much the same course as an inflammation in any similar structures, ending either in resolution or suppuration. When ending in resolution, which is rare, we find the redness, pain and swelling diminish; the localized induration lessen; the constitutional symptoms, if there were any, disappear; nursing becomes less painful; and shortly all traces of the affection vanish, leaving the breast as before the attack.

"If, on the other hand, the inflammation does not subside we find the engorgement of the tissues increasing; the tenderness growing greater; the inflamed area extending; nursing becoming more and more painful, or altogether impossible; the lancinating pains unendurable, and finally rigors or a positive chill ushers in the formation of pus.

"Usually in the subcutaneous or superficial variety we find the abscess single, pointing near the nipple, running its course rapidly and ending by incision, or spontaneously discharging through the skin, or into the ducts and through the nipple, leaving the gland itself in an uninjured condition. Frequently, however, it does not run this straightforward course, but the pus, making its way in the direction of least resistance, extending and deepening, it opens into the gland, setting up true glandular mastitis; or by its involvement of the nipple, the tumefaction and interference with the free discharge of the lacteal secretion, it causes a general engorgement of the gland, and thus sets up a secondary inflammation, which speedily becomes active, leading to the formation of the true glandular mammary abscess and its consequent troubles.

"2. In the glandular variety of mammary inflammation, when occurring primarily, we find usually some circumscribed spot which is sensitive to pressure speedily followed by a sense of heaviness and weight in the entire breast, with lancinating

pains and an engorgement of the vessels of the gland. Soon swelling begins, a flush appears, the temperature rises, and the inflammation is fully established. By the tumefaction the calibre of the ducts is lessened and the flow of milk diminished, and its retention aids in increasing the pain and spreading the inflammation.

"Inflammation of the gland ends either in resolution, which, alas! is too infrequent, or in suppuration. When resolution takes place we find changes most pleasant to see. The redness, pain and swelling grow less, the induration gradually disappears, the flow of milk increases, and soon there exists only the remembrance of trouble and a fear of it, which lasteth long.

"When it proceeds to suppuration, the engorgement, the redness and sensitiveness, the pains and the interference with the flow of milk, the induration and the constitutional symptoms all increase. An intense restlessness tortures the patient, and soon a hard chill, or more than one, indicates the formation of pus. The swelling increases, the skin becomes hot, red and œdematous, fluctuation becomes apparent, increasing as the quantity of pus increases, and draws nearer the surface. Soon, in the milder cases, the abscess points, and by incision, or by spontaneous evacuation, discharges its contents. Often the pus is discharged, mixed with the milk, through the ducts, and without external opening.

"In the more severe cases there may be more than one point of discharge, leaving fistulous openings through which pus and milk escape for some time, exhausting the patient and doing infinite damage to the breast and its future usefulness. At times, even when the abscess is small and the symptoms mild, the discharge occurring early, and the subsequent healing being rapid, we find, shortly after the case is apparently at an end, another abscess forming, which runs a course similar to the first, ending in discharge; and shortly, again, another, forming an exhaustive succession, producing collectively a most serious effect on the patient's general health, and leaving the gland often permanently indurated and useless.

"Occasionally the inflammation of the gland becomes chronic, lasting for weeks or months before suppuration takes place, and going through its various stages with extreme slowness, but with all the accompaniments of pain, swelling and engorgement belonging to the more acute forms.

"Though the usual result of abscess of the mammary gland

is to impair its secreting power, it sometimes happens that the gland resumes its full function after a severe abscess. When this occurs, however, the tendency to a return of the trouble is increased.

"3. In the third or sub-glandular variety we find the primary inflammation seated in the deep cellular tissues underlying the gland. Owing to the dense mammary gland above, and the unyielding chest wall below, the pain from the beginning is more severe than in the other forms of mastitis. There is at first little but the pain to indicate trouble; if, however, the inflammation does not subside, but continues, there soon appears an elevation of the entire gland, the pain increases, becoming more and more severe, a diffused flush appears, and soon a chill shows the formation of pus. The constitutional symptoms become more distressing, the breast is elevated and seems to float upon a sea of pus. The pus forms slowly, and with extreme slowness makes its way to the surface, frequently finding exit through several openings, leaving long fistulous tracts, which heal slowly and exhaust the strength of the sufferer.

"Sometimes the pus escapes upwards, passing into and through the gland. In this variety there is but little interference with the secretion, until the extreme sensitiveness prevents nursing and leads to lacteal engorgement, or the drying up of the milk.

"The injury to the gland itself is often trifling compared with that left by the glandular form; and even after a long-continued suppuration, fistulous troubles and great exhaustion, we may find another and luckier child thriving on the product of the self-same breast."

TREATMENT.—"As soon as inflammation of the breast is certainly made out, the first duty of the attending physician will be to discover the cause, if possible, and to remove it. Careful examination of the nipple should therefore be made for any cracks, fissures, or abrasions, since these are so often the causes of the deeper-seated inflammation, and such lesions should receive the treatment appropriate to whichever may exist. A careful and thorough examination should be made of the extent of the inflammatory process, since different treatment will be indicated according as to whether the inflammation is deep seated in the parenchyma of the breast, or more superficially in the superficial connective tissue.

"In the latter case there is usually but little suffering, com-

paratively, seldom enough to prevent the mother from nursing her child, and therefore the notice of the physician is not often called to the trouble until it has advanced to the stage of suppuration, or is so far advanced that suppuration is inevitable. Under these circumstances the treatment called for is simply the application of such means, like poultices, as will encourage rapidly the formation of pus, which should be evacuated as soon as discovered, by incision into the abscess made in the line of the milk ducts and running towards the nipple.

"This usually ends the trouble, unless there have been several points of inflammation. If there is not much pain from nursing, or in the opening of the abscess no communication has been made with the nipple by the cutting open of a milk duct so as to permit the mixture of pus with the milk, the woman should be encouraged to continue nursing her babe, while all proper care is given to any trouble that may exist in the nipple.

"Should the inflammation, however, be found to extend down deep into the parenchyma of the breast, that form which is more frequently found to exist at the puerperal period, the indications for treatment, other than those already pointed out in the removal of the cause, are to bring about rest and freedom from pain, the object of the treatment being, if possible, to bring about resolution, and thus leave the organ in a condition to continue its function.

"The rest must be absolute. Rest from functional activity, rest from handling, rest from the dragging of its own weight, and, at the same time, rest from pain, with its accompanying feverishness and restlessness.

"To bring about this rest, the physician must first order the woman to stop nursing from the inflamed breast entirely, and furthermore forbid all rubbings, frictions, or use of the breast-pumps to remove the milk under the mistaken notion that the retained milk is the cause of the inflammation, and he should watch carefully that his orders in both respects are obeyed.

"In the early stage of the inflammation, and while resolution is possible, I think all medicinal applications are useless, though I have, at times, in accordance with the advice of some, made use of Deshler's salve, Iodide of lead ointment, and Belladonna ointment. I am fully convinced, however, that useful as such applications may be in the condition of engorgement preceding inflammation, they are of no use when the latter has occurred.

"Particular warning is to be given against the use of hot

poultices for so long a time as resolution is possible, as they only favor suppuration, and their prolonged use has the effect to soften and make boggy all the structures."

[We set great store by the thorough use of hot fomentations, and have seen no suppuration where they were faithfully used from an early moment.]

"The method of treatment that I have found most satisfactory has been that of bandaging. The breast is first covered with cotton wool, and a bandage well and carefully applied, with sufficient pressure to uphold the breast, by its support, from the dragging weight so much complained of by women, and, at the same time, by its compression it keeps the breast perfectly quiet, and is further useful, if applied by the physician himself, as a guard against meddlesome interference by the nurse or by some well-meaning but mistaken relative. This bandage should be carefully applied new each day, and will, with the appropriate homeopathic remedy, frequently produce a resolution in three or four days, when nursing can be carefully renewed and continued. Should the inflammation continue, and instead of resolution suppuration occur, a condition of things which may be suspected if the fever and pains continue a number of days notwithstanding the rest, bandaging, and exhibition of the indicated remedy, and may be diagnosed with certainty if the fever, which has declined, suddenly increases, and with it there is an increase of pain with chills or chilly sensations; while the swelling becomes softer and more boggy-feeling to the touch and more superficial in appearance, the use of the bandage may be done away with and warm flaxseed poultices applied, changing them often enough to keep up a constant application of moist heat.

"As soon as pus can be discovered and located, the abscess must be opened and free exit given to the pus.

"If it be superficial, it is easily opened by a linear incision running in the line of the milk ducts towards the nipple. If the situation is deep it may be necessary to etherize the patient. An incision is then made through the skin and superficial fascia overlying the most prominent part of the swelling; a grooved director should then be forced through the tissues into the abscess, and along the groove of the director a pair of ordinary dressing forceps be guided into the abscess, when, by opening the handles, the tissues will be pushed far enough apart to give exit to the pus.

"If there are several abscesses, each must be opened in this way, and if there are dependent pockets from which pus cannot flow by its gravity, counter-openings must be made at the most dependent positions until there is secured a free drainage, as otherwise, notwithstanding the openings, the pus will decompose and burrow, causing fistulous attacks and constitutional symptoms.

"In these deep-seated abscesses drainage-tubes must be used, and the track of the abscess washed out daily with boiled water until such time as the water flows back clear, when they may be removed and the breast carefully bandaged and compressed.

"The most satisfactory manner for producing this compression is the use of a compressed sponge, as suggested by Gross. His method is to take a clean, flat, compressed sponge and envelop the breast, already covered with cotton-wool, with it. A neatly-fitting bandage is then applied and water introduced through the bandage onto the sponge, which swelling causes an even compression of the breast, relieving the engorgement and, at the same time, pressing together the abscess walls.

"In certain rare cases the inflammation and suppuration occur in the connective tissue between the thorax and the breast. When this is diagnosed by the deep-seated character of the pain and swelling, and by the manner in which the breast is lifted up and pushed away from the thorax, the abscess must be opened as soon as pus is suspected without waiting for any pointing, as from its locality there is great danger of extensive damage resulting from the burrowing. The breast is lifted away from the thorax, and the opening made from below at the most dependent position.

"I have said nothing about the use of remedies to be given internally beyond the directions to give that which is best indicated, because I have no new remedy or remedies to propose, and cannot feel justified, in an article like this, in taking up space with a copy of matter already well written up in our repertories and text-books.

"It is undoubtedly a mistake, in my opinion, to pin one's confidence alone on the homeopathic remedy in cases of this kind to the neglect of procuring rest to the part by bandages, rest being always indicated to all inflamed parts; and I think, on the other hand, that it may safely be considered as equally

unwise to depend only upon the mechanical treatment to the exclusion of the homeopathic remedy; but with the two in combination, and with the exclusion of all useless local applications, I have found but a small number of cases where I have failed to bring about resolution. But it must not be forgotten, that when it does fail, and suppuration does occur, it takes the case out of the domain of medicine into that of surgery, and that to prevent the mischief that confined and burrowing pus will cause in tissues so easily burrowed through and destroyed, the knife must be used, and used early."

THERAPEUTICS.—The following repertory of mastitis is from that worthy son of a noble father, William J. Guernsey, M.D., and was published in a recent number of the *Medical Advance*.

"As *Lac caninum* and *Phytolacca* are far ahead of any other remedies in aborting this trouble, a comparison may be of service.

LAC CAN.	PHYTOLACCA.
Affects one breast as much as the other; as *Phytolacca* acts particularly on the right and *Lac can.* on *either*, it may be given preference to the *left*. If there has been soreness or pain alternating from one breast to the other, or migratory trouble of any sort about the patient, it should be used.	*Right* breast.
Much soreness, fullness and pain, but not so much inflammation, although this latter should not rule it out of consideration.	Inflammation marked with soreness, fullness, and pain.
Very much worse from least jar; has to support the breast in walking about, especially on going up or down stairs. Even worse from inspiration.	Not so pronounced.
Induration in small lumps like marbles. Considering the fact that its membranous exudation in the throat is in small specks, I have (on the rule of similars) marked this "nodulated breast" high under *Lac can.*	Same in lesser degree; but it has cured for me many cases of a *single* stony induration.
Markedly worse *towards evening*—and EVENING.	Worse after midnight; better in afternoon.

REMEDIES IN GENERAL AFFECTING THE

Mammæ.—Acon., aes., aeth., agar., agn., all. s., alum., amb., am. c., am. m., anac., ang., ant. c., ant. t., apis, arg. n., arn., ars., arum, asaf., bary. c., bell., berb., borax, bov., brom., bry., cac., cal., cal. p. calad., camph., can. s., canth., carbo a., carbo v., castor, caust., cham., chel., cinch., cic., cim., cina., cist., clem., coc., coff., col., con., crot. t., curare, cyc., dig., dul., frag., gamb., gels., graph., grat., guaiac., ham., hep., ign., ipec., iod., kali b., kali c., kreos., lac can., lac def., lach., lact., laur., led., lepi., lil. t., lyc., mag. c., mang., mer. c., mer. s., mer. v., mez., mill., mosch., mur., nat. c., nat. m., nic., nit. ac., nux j., nux v., op., pet., phel., phos., phos. ac., phyt., plat., plumb., prun., psor., puls., ran. b., ran. s., raph., ratan., rheum., rhod., rhus., ruta, sabad., sab., samb., sang., sars., sec., sep., sil., spong., squil., stan., staph., stram., sulph., tar., ther., uva u., verat., zinc.

Mammæ—*Continued.*

Mammæ Left, aeth., agar., alum., amb., apis, berb., bor., bov., cac., cal., cal. p., cis., con., cyc., grat., lac can., lil. t., lyc., mag. c., mosch., phel., phos., phyt., plumb., sil., spong., zinc.

Mammæ Right, all. s., amb., cal., con., gamb., grat., kali b., kreos., lac can., mez., phyt., plumb., psor., sang., sil., zinc.

SUBJECTIVE SYMPTOMS.

Aching, apis, bov., con., lac can., lil. t., mosch., stram., zinc.

Air, *streaming through,* cyc.

Burning, aes., amb., apis, ars., bell., cal. p., con., iod., laur., led., lyc., phos., sang.

Coldness, cim., coc., dig., rhus.

Compression, ther.

— *backward,* ther.

Constriction, lil. t., sang.

Contraction, bor., cal. p., stram., verat.

Cord, *around.*

Cramp-like pain, lil. t., plat.

Cutting, bell., lepi., lach., lil. t.

Darting, carbo a., grat., iod., kali b.

Drawing, cal. p., kreos., lil. t.

Fulness, bell., bry., clem., cyc., lac can., lact., mer. v., nux v., phyt., sec., sep.

Grasping, lil. t.

Griping, bov.

Gurgling, crot. t.

Heaviness, bell., bry., clem., lil. t., ther.

Itching, agar., alum., anac., ant. c., arn., ars., bary. c., berb., bov., cal., canth., carbo v., caust., con., kali c., led., lyc., mez., nat. m., nic., nux j., phel., phos., plumb., rhus., sabad., sep., spong., squil., stan., staph., sulph.

Itching—*Continued.*

Lancination. *See* CUTTING.

Milk flowing in, *as from,* kreos.

Pain (*undefined*), ang., ant. c., arn., bary. c., bell., bor., bry., cac., calad., cal., con., crot. t., cyc., iod., kali b., lach., lac can., laur., lil. t., mer. s., murex., phel., phos., rheum., rhus, sang., sil., verat., zinc.

— *extending backwards* (*through chest; to lumbar region; to scapula; to spine*), lil. t.

— — *downward to navel,* agar.

— — — *side,* prun.

— — *forwards beneath sternum,* sang.

— — *inwards,* phel.

— — *nipple* (*from periphery to the*), kreos.

— — *outward,* gels., mez.

— — *upward to arms,* curare.

SUBJECTIVE SYMPTOMS—*Continued.*

Pain, *extending upwards to neck*, lil. t.
— — *shoulders*, lil. t., mag. c.
— *labor, as though from*, lach.
Pinching, agar., cal. p.
Pressure, am. m.,cal. p., phos., phos. ac.
— acute, phos. ac.
Prickling, cal., cim., ran. s.
Pulsation, bell.
Rawness, mer. v.
Sensitiveness. *See* TENDERNESS.
Shivering, as if, guaiac., nux v., pet.
Shooting, cal. p.
Soreness, all. s., ang., arn., arum, bry., calad., cal., cal. p., cic., graph., lac can., mer. c., nat. m., phyt., rhod., sang., sep., sil.
Stitches, aeth., all. s., alum., amb., apis, arg. n., bary. c., berb., bor., bry., cal., carbo a., cim., clem., con., cyc., gamb., gels., graph.,
Stitches—*Continued.*
grat., ign., jod., kali b., kali c., kreos., laur., lil. t., lyc., mag. c., mez., murex, nat. m., phel., phos., plumb., prun., psor., rheum, sang., sep., sil., thuja, zinc.
— *fine*, plumb.
Suppurative pain, cal., clem., hep., phos., plumb., sil.
— *sensation*, sil.
Swelling as if, berb.
Tearing, amm. c., amm. m., bar. c., cal., cal. p., carbo v., con., crot. t., grat., kali c., sang.
Tenderness, cal., cham., clem., con., graph., lac can., mer. v., nat. m., phyt., ther., zinc.
Tension, cyc., puls.
Tingling, sab.
Unpleasant (*indescribable*), phos.

OBJECTIVE SYMPTOMS.

Abscess. *See* SUPPURATION.
Atrophy, ars., con., frag., iod., kali i., kreos., nit. ac., nux m., sars.
Bluish, *livid hue*, lach., phos., plumb.
— *red hue*, kreos.
Distension, cyc., zinc.
Emaciation. *See* ATROPHY.
Fever (*milk fever*), acon., arn., bell., bry., cham., coff., ign., mer. v., op., rhus.
Flabbiness, bell., camph., con., iod.
Heat in, acon., bell., bry., cal. p., mang., raph., sulph.
Induration, arn., bell., bry., cal., cal. p., carbo a., cham., clem., col., con., cyc., graph., ham., lac can., lepi., lyc., mer. v., nit. ac., phos., phyt., plumb., puls., ruta, sep., sil., spong., sulph.
Inflammation, bell., bry., cal., carbo a., carbo v., cist., con., hep., lac can., mer. v., phos., phyt., sil., sulph.
Milk, *bad tasting*, bor., mer. v.
— *bitter tasting*, rheum.
Milk, *bluish*, lach.
— *cheesy*, cham.
— *copious* (*too*), acon., ant. t., asaf., bell., bor., bry., cal., cinch., con., iod., kreos., lach., lac can., lyc., nux v., phos., phyt., puls., rhus, stan., staph., stram.
— *purulent*, cham.
— *retarded by cicatrices*, graph., phyt.
— *salt tasting*, carbo a.
— *scant*, agn., asaf., bell., bry., cal., caust., cham., chel., cinch., dul., lac can., lyc., mer. v., mill., phel., phos.
— *spoiled*, bell., bor., carbo a., cham., cina., ipec., lach., mer., nux v., puls., rheum, samb., stan.
— *stringy*, kali b.
— *thick*, bor.
— *thin*, carbo a., kali b., lach., puls.
— *wanting*, agn., asaf., lac can., urt. u.
— *yellow*, rheum.
Redness, *radiating from center*, bell., sulph.
Redness, *streaks of*, phos., rhus.

OBJECTIVE SYMPTOMS—*Continued.*

Suppuration, *inevitable*, hep., sil.
— *threatened*, asaf., bell., cal., cist., dul., kali c., kreos., lac can., mer. v., nat. c., phos., phyt., puls., sep., sulph.
Swelling, aeth., all. s., apis, asaf., bell., berb., brom., bry., cal., cham., clem., con., cyc., dul., graph., hep., lach., lac can., lyc., mer. c., mer. s., mer. v., phos., phyt., plumb., puls., rat., sab., samb., sil., sulph., tar., uva u. zinc.
— *lumps like marbles*, lac can., phyt.
Uncertain, phos., phyt., sil., sulph.
— *fistulous*, phos., phyt., san., sil.

AGGRAVATIONS AND AMELIORATIONS.

Afternoon, < aeth., bell., bry., nit. ac., phos., puls., sang.
Ascending stairs, < bell., cal., carbo a., lac can., lyc., nit. ac., phos.
Bed (*in*), < mur.
Bending forwards, < grat.
Breathing in. *See* INSPIRING.
Cold, < *from*, sep.
— *taking* < acon., bell., bry., cac., cal., cham., dul., mer., nux, phos., puls., rhus.
Contusion, < arn., carbo a., con., ham.
Day < con.
Empty, < *when*, bov.
Erect < *on becoming*, graph.
Evening < arn., bell., bry., con., lac can., nit. ac., phos., puls., spong.
Exercising, < ang., laur., ran. b.
— *arms*, < ang., ant. c.
— *open air*, < am. m.
Flow of milk, > cyc.
Holding them. *See* SUPPORTING.
Inspiring, < carbo a., grat., lac can., mag. c., plumb., prun.
Inspiring deeply, < prun., sang.
Jar, < bell., cal., carbo a., lac can., lyc., nit. ac., phos.
Lifting. *See* SUPPORTING.
Lying, *on left side*, < lil. t.
— *painful side*, < lil. t.
Menses < *after*, cyc., ther.
— *before*, cal., con., cyc., lac can., sang., spong.
— *delayed*, bar. c., cal., con., dul., iod., mer. v., phos., rhus, ther., zinc.
Menses, *during*, cal., carbo a., caust., con., dul., iod., lac can., lac def., mer. v., phos., sang., ther., zinc.
— *suppressed*, rat.
Morning, < calad., cal., carbo v., chel., lit. t., nux v., rhus, sang., zinc.
— > spong.
— *bed*, < *in*, plumb.
Motion, < sep.
Night, < acon., arn., ars., cham., con., dul., graph., hep., iod., mer., nit. ac., plumb., sil.
Noon, < mag. c.
Nursing, < bor., carbo an., crot., kali c., phel.
— *opposite breast*, < bor.
Paroxysmally, < castor.
Periodically, < ars., kreos., mer. s.
Position, *change of*, > lil. t.
Pressure, < ant. c., cal., carbo a., lac can., mer. v., murex.
— murex.
— >, kreos.
Rest, <, rhus.
— >, kreos.
Riding, <, sep.
Rubbing, <, con.
— >, castor.
Sitting, <, prun., ther.
Sneezing, <, phos. (*Compare* JAR.)
Stretching body, <, ther.
Supporting breast, >, bell., cac., cal., carbo a., lac can., lyc., nit. ac., phos.
Touch, >, cal.
Walking, <, lac can., prun., sep., stram.

CHAPTER IV.

PUERPERAL FEVER (CHILD-BED FEVER).

DEFINITION.—A form of fever peculiar to the puerperal state, from autogenetic, as well as from hetero-genetic causes; usually occurring from the third to the fifth day after labor, with an average duration of seven to fourteen days; terminating in convalescence and recovery, or death. In exceptional cases a series of sequelæ may happen, spreading over a period of weeks or months, consisting of abscesses, pyæmia, hydropsic conditions, decubitus, debility and death.

Dr. R. Barnes, of London, says: "As fevers of various kinds may assail non-puerperal persons, so they may assail puerperal. We must therefore consider puerperal fever as *a fever in a puerpera,* and abandon the vain attempt to find only *one definite puerperal fever,* but recognize the clinical fact that there are *puerperal fevers.*"

HISTORY.—It has probably been the occasional affliction of the parturient woman in all the ages and experience of humanity. There is traditional authority for supposing that Rachel, the beloved wife of the patriarch Jacob, died of this disease, it being the first case of puerperal fever of which we have any record. It may be either epidemic, traumatic or sporadic. It is always most violent in the epidemic form. The earliest of medical literature gives accounts of the disease, and we have excellent examples in the writings of Hippocrates, and the Arabian physician Avicenna. It prevailed in Paris as an epidemic in 1746, with great mortality. In 1786 it raged epidemically with great violence in the flat malarial plains of Lombardy, from which "not a single puerpera recovered." In 1740 London had an epidemic, when "every female seized with the malady succumbed." As late as 1860 and 1863 it was epidemic in various parts of Germany, especially in the lying-in institutions, and very fatal. Its great prevalence and mortality in the experience of certain practitioners has at times been noteworthy; so as to drive them for a time from practice.

So great an authority as the late Professor Charles D. Meigs, regarded puerperal fever as either a metritis or a peritonitis, and insisted that it was not contagious; but says: "What the real essence of this epidemic is, I believe no man can say." In

Philadelphia many years since, there was a certain Dr. Rutter cotemporary with Dr. Meigs, a noted physician, who had a large practice confined to midwifery, and his clientage was among the first families of Philadelphia. During one year he had seventy cases of puerperal fever. On account of his bad experience, he was charged with being "a carrier of contagion," and so he gave up practice and left town for some weeks. On his return, he changed his clothing, took a bath, shaved his head closely, and left behind his watch, pencil and other personalities that he had about him previously. He then went out and attended a lady in labor; the parturition was not difficult, but the patient was soon attacked with child-bed fever, from which she succumbed. It was, upon a careful investigation, proved that all the cases of the disease that had occurred in his practice came from external infection (a hetero-genetic cause). The contagion was transmitted manually from Dr. Rutter himself, for he had been affected with a bad ozena, probably syphilitic, and the poison from this disgusting malady, with its bad odors, was through him carried directly to his patients; so that he infected nearly every puerperal woman that he came in contact with. The route of contagion was from the nose to his pocket-handkerchief, thence to his hands and fingers, and then easily to his patients. This remarkable case of contagion, propagated by a distinguished physician and specialist, reminds us of the words of Dr. Emmet: "Many a woman's death-warrant is carried under the nails of her surgeon."

With puerperal disease we may have insanity. Probably moral, as well as hereditary, causes have an influence in its development, especially among the upper classes. Again, a puerperium with any hereditary taint of insanity will be more liable to mental troubles that may be developed during pregnancy or confinement, in the form of either mania, melancholia or monomania, usually the first named.

Among the laboring-classes, physical causes, exposure, hard life, poor nourishment, and anæmia may be reckoned as factors. Lastly, young women with concealed pregnancies, or abortions with illegitimate offspring, may have mental ailments, even mania, during their lying-in period.

ETIOLOGY.—Woman in her puerperal state seems to lose for the time much of what the old authors called the *vis conservatrix naturæ;* that is to say, she loses the power to resist the

adverse influence of any toxic or traumatic agency by which she may happen to be environed. There is now no longer any reason to doubt that if she be surrounded by cases of typhus, diphtheria, scarlet fever, erysipelas, or have a violent labor with injuries to the soft parts, her danger of puerperal fever will be greatly increased. It must be admitted, however, that some occult influence may produce an occasional case, where none of the above named agencies seem to have any part. The close, bad air of large hospitals, and their nosocomial emanations, may serve as a cause.

It may be caused by the absorption of decomposed matters within the uterine cavity, as in the case of abortion, when the delivery is incomplete and the after-birth only partially delivered. The remains of the placenta and coagula left behind may cause irritation and inflammation that may induce septic fever. It may be contracted by contagion from another puerperal patient suffering from the same infection, especially during the prevalence of an epidemic. After a severe and lingering labor, if the perineum is badly lacerated, and the injury left unrepaired, *puerperal fever is more liable to attack the patient who has not been operated upon.**

Medical men who attend patients in hospitals, who make post-mortems, visit dissecting rooms, are not always scrupulously clean in their persons, do not bathe themselves and carefully change their clothing, and wash their hands in antiseptic solutions immediately before coming into the lying-in room, may infect a puerperal patient with the fever.

Nurses who are untidy and careless in their persons, and do not care for the patient properly, may themselves be responsible for the disease. Any neglect to keep the patient's person clean, especially in hot weather, may serve as direct or predisposing cause.

An acute gonorrhœa at time of labor may, by inducing

*Before leaving a lying-in patient, the accoucheur should satisfy himself by ocular evidence whether any rupture of the perineum has occurred. If a rent is found, and it extends over one-half or three-fourths of an inch, it should be repaired immediately. Every accoucheur should be prepared for such an emergency. A good pocket case of instruments containing straight and curved needles, a forceps needle-holder and Chinese silk, or silkworm gut ligatures will be required, and with the aid of the nurse the laceration should be repaired within the first six or twelve hours after delivery. If the *immediate operation* is not made, the patient is necessitated to wait for three months for the secondary or *remote operation*, and will have to go through with the anxieties, trials, expense and dangers of a "second lying-in." The immediate operation is much easier for the patient than the secondary. Usually within four or five days union takes place.

T. G. C.

salpingitis, result in the fever. It should be known to the profession that gonorrhœa involving the fallopian tubes subjects any woman who conceives to many dangers. Experience proves that abortion or labor aggravates an existing gonorrhœa, be it acute or chronic, and after such a labor, a "gonorrhœal puerperal fever," or a gonorrhœal peritonitis, may follow, from which the woman is liable to succumb.

FREQUENCY.—This fever is rare except as an epidemic in large cities and hospitals, so that a country practitioner who may not have had experience with an epidemic, may go through a large and long professional experience and not see more than half a dozen cases.

SYMPTOMS.—The first symptom is usually a chill or rigor, of short duration, followed by a violent reaction; as indicated by great heat of the bodily surface, high thermometric range in all the cavities that can be approached—102° to 104°; pulse 110 to 120; hasty short respiration with all the manifestations of great bodily distress and unrest. The pulse is small, quick, thready. The tongue is coated, dry, brown, with an unquenchable thirst. More or less of delirium usually cuts a figure in these cases. The bowels may be either confined or diarrhœic. The urine is scanty and highly colored, with strong disagreeable odor. The lochia is suppressed altogether, or if present, in small quantity, is dark, thick and fœtid. There is loathing of food, and sometimes nausea and vomiting. Simultaneously, or almost immediately after the appearance of the febrile symptoms, we discover evidences of certain important local phlegmasiæ, in the shape of metritis and peritonitis. The entire abdominal and pelvic contours become greatly distended, very painful, excessively tender and very hot. There is usually much pain in the head and a severe backache. There has been much disquisition and controversy as to whether there may be a genuine fever without these local manifestations and complications. To affirm or deny this view of the matter might be scientifically unsafe and rash, at least as to exceptional cases. But we think it safe to affirm that the almost simultaneous appearance of the fever with these local indications is such as to render the fever and the local phlegmasiæ as but parts of the diseased conditions. Practically, the fever bears the same relation to the local symptoms as does fever to pneumonia, rheumatism, synovitis, enteritis or cerebritis. Possibly, where a patient dies in forty-eight or sixty hours from great intensity of the fever, with hem-

orrhage or convulsions, a post-mortem examination might reveal little or no local disorder. But such cases, we think, will be found an exception to the very general rule of an intimate association between the fever and the local trouble. In cases of fever from traumatism we suspect the local difficulty may have precedence of any febrile appearance.

DURATION.—This violent group of symptoms usually reaches conclusions from the sixth to seventh or tenth day. By or about the sixth day the symptoms abate and the patient reaches convalescence, or she dies suddenly under a collapse. In exceptional cases neither death nor recovery takes place at the periods indicated, but a series of troubles may follow in the form of abscesses, fistulæ, sinuses, dropsies, decubitus, debility or dementia, dragging their slow length along over many weeks or even months. Such a case we had recently in private practice, with all the above complications continuing for nine months with recovery.

DIAGNOSIS.—The symptoms are ordinarily so bold and pronounced as to make diagnosis easy and certain. There is a small group of symptoms frequently occurring about the period of the setting up of lactation, that may sometimes give a little temporary anxiety to both patient and physician. But some suitable homeopathic remedy that may be indicated for the fever, with moist heat, in any convenient form applied locally over the abdomen, with full hot-water irrigation of the intestines, will banish this condition of affairs very speedily and so set matters all right.

PROGNOSIS.—Under the most favorable surroundings, including skill and experience in medical attendance, it must be confessed that the outlook is not safe or certain. In an epidemic form, the mortality has sometimes been fearful. The prognosis now under homeopathic treatment is usually favorable, but in case of an epidemic it must be guarded.

PROPHYLAXIS.—Under this head the matter of supreme importance is perfect cleanliness on the part of the patient and all in attendance upon her. Previous to making a vaginal examination, the accoucheur should wash his hands in warm water, with soap, always using a nail-brush, and moisten them afterwards with a weak solution of sublimate, boroglyceride, listerine, salicylic acid, carbolic acid or creolin.

We prefer creolin—one to two per cent. solution. It is a germicide and said to be equal to sublimate, without any

dangers of the latter. Of course all instruments in use, sponges and utensils that come in contact with the patient, should have the same attention as the hands. Every hospital should have a sterilizing oven, where all the clothing, bandages, etc., that come in contact with the patient, should be heated and thoroughly sterilized, so that no germs may exist.

I have recently had a very satisfactory experience in the use of the "accouchement sheet" for the protection of the bed during labor. It is very comfortable for the patient, soft as wool and about the thickness of two ordinary comforters. It comes in sheets large enough to cover the bed, and is known as "wood wool." It is not expensive and answers a most admirable purpose, being waterproof on the under side; is porous, antiseptic and absorbent on the upper surface. After the completion of labor this antiseptic accouchement sheet may be removed and burnt, and the mother has her mattress not in the least soiled; comfort is thereby insured and the risk of puerperal disease greatly lessened.

As a further precaution in the antiseptic line, I have the vulva thoroughly sponged with some mild detergent application at least three times per day. Should there be a free disagreeable lochia, I have the vagina irrigated with a warm solution, in mild form, of some one of our admirable antiseptic preparations already mentioned. I have in former years employed corrosive sublimate, 1 to 5,000, boroglyceride, carbolic acid, listerine, and last, but not least, calendula. I have recently had very satisfactory results from a solution of creolin used locally (one to two per cent., or about one teaspoonful to the pint of water). Where there are any suspicious indications or surroundings, to prevent the introduction of septic germs I advise a pad or pack of antiseptic cotton, first made moist with the solution of creolin, to be kept constantly applied to the entire vulva.

Some practitioners prefer to use a pad of sublimate gauze, and we have employed it formerly before the discovery of creolin. The pad should be changed whenever it is soiled. The necessity or propriety of washing out the uterine cavity must be determined by the circumstances in the case; it should never be trusted to the nurse, but must be cautiously performed by the physician. The infection of puerperal fever may propagate itself, or it may have come from external contagion, and all of the above precautions are of more or less value in any case of labor. *But should the puerperal patient be in the neighborhood*

of any infectious disease, they are absolutely indispensable. No practitioner who has under treatment a patient with infectious disease should ever allow himself to take charge of a case of labor.

Under the head of Prophylaxis we desire to say that in the near future the large lying-in-hospitals, now the boast and pride of our great cities, must give place to a series of one-story cottages, located in rural districts. They should be constructed of iron or other non-combustible material to guard against fire, with room for not more than six patients; should be heated by steam or open-grate fires, and not by stoves or furnaces. Every such hospital should also have a sterilizing oven, so that the complete modern details of a perfect antisepsis may be carried out. Each cottage should be entirely separate from its neighbors, and should have a labor room adjoining, from which, after labor, the patient may be conveyed to her place in the cottage. With the present facilities furnished by street cars, railroads, telegraphs and telephones, correspondence and attention at a distance of five to ten miles in the country could be accomplished with the utmost dispatch and facility.

POST-MORTEM APPEARANCES.—Upon opening the abdomen there will be found a most conspicuous display of lymphy exudation from the entire peritoneal surface; it is thick and heavy, and, if the case shall have attained five or six days' duration, may present signs of partial organization. The viscera are all glued together in a most grotesque and striking condition. In violent and malignant cases the parts may show signs of gangrene and disintegration.

TREATMENT—*Aconite.*—Fever that sets in with a chill; the fever is of a high grade, like a real synochal fever, with dry skin, hard pulse, great thirst, shooting pains in the abdomen and uterus, abdomen very sensitive to pressure. Predicts the hour she will die.

Belladonna.—Pains and fever set in suddenly; throbbing headache; face red and hot; eyes red; throbbing of the carotids and indications of cerebral congestion; patient delirious; indicated when the delirium is furious. Dr. Hughes recommends it for peritoneal complications, and Baehr suggests its use for the above symptoms with vomiting.

Arsenicum alb.—Sudden sinking of the strength; cold perspiration, great thirst for small quantities of water at short intervals, constant vomiting, restlessness, anguish, fear of

death, a tired feeling, which is soon followed by extreme exhaustion, showing evidences of a rapid change in the blood, a toxic condition from the catalytic effect of the blood-poison being diffused through the whole system.

Veratrum alb.—Vomiting and diarrhœa; extremities cold; lochia suppressed. Hippocratic countenance; breath cold, collapse threatened. May be used after *arsenicum*, or in some cases given in alternation. Compare also *carbo veg.*, a keynote for which is, much flatulence, relieved by eructation, generally better after being fanned.

Baptisia.—Useful in the early stage; tongue white with reddish papillæ, fœtid breath; patient delirious, sensitive in the iliac region; all the secretions are offensive, especially sweat and urine, with frequent attacks of faintness and exhaustion.

China.—Painless diarrhœa, involuntary stools, frequent eructations, which give no relief.

Muriatic acid.—Low form of fever, when it is really adynamic; patient has stupid delirium, intermittent pulse, and frequent discharges from the bowels, with tendency to slide down in the bed; deep respiration with sighing and groaning; paralysis of the urinary and intestinal tract,—involuntary discharges from both; excessive prostration, indicating unmistakably that patient is in an extreme condition; breath fœtid, lining of the mouth inflamed, and patient apparently near her end.

Bryonia.—An important remedy, especially in early stage; patient restless; has a headache, pain in the limbs; all of the symptoms are aggravated by the slightest motion; there is constipation.

Rhus tox.—Low form of the fever, great restlessness, relief for awhile, worse at night; slow fever and dry tongue. This remedy is indicated in some cases in alternation with *bryonia.*

Veratrum Viride.—Many years since we gave *veratrum viride* tincture, in two or three drop doses, in the commencement of the fever, when there was a sudden rise of the pulse (120) and accompanied with weakness. Simultaneous with *veratrum*, we gave the patient stimulant doses of whisky and carefully watched the effect. We certainly found the best results from the occasional and cautious use of these two remedies.

Quinine.—In certain cases, we have found *quinine* indispensable. When we have an unmistakable intermittent complication, ushered in suddenly with a chill, followed soon after by a sweat, and such a reaction as to indicate that the patient will, at the

expiration of twenty-four hours or sooner, have a repetition of the paroxysm, a few doses of *quinine* will, in many instances, entirely break the attack.

The dose of *quinine* may be two or three grains every two hours until some twenty to thirty grains shall have been taken.

Gelsemium.—This is an important remedy, and is especially useful when the case is of an intermittent variety; the patient has nervous chills, the effect of emotional excitement or depression.

Antipyrine.—In exceptional cases, this remedy may be useful, where patient has high fever in the morning, wants water, and has a dreadful headache, with pain in the frontal sinuses. Dose, five grains every two hours until about four doses shall have been given.

Phenacetine.—This remedy is a reliable antipyretic, and may be used where the patient complains of great pains in the limbs, with headache, and fever with restlessness, and when other medicines have failed. It is a remedy much safer than antipyrine, and may be used in doses of from four to six grains every two hours.

Oleum tereb.—Great tympanitis with eructations, fœtid diarrhœa, diminished secretion of urine, hemorrhage from the bowels, bloody albuminous urine; tongue smooth, red and shining. It may be applied externally for the tympanitis, and abdominal tenderness, by means of stupes. Saturate a piece of spongio-pilline with the turpentine and apply it over the abdomen. Internally, it may be taken in doses of three to five drops, either in hot milk, or gum arabic emulsion.

Mercurius cor.—This remedy has been recommended in puerperal cases where we have the development of septic infection. There is catarrhal inflammation of the bowels, with bloody, slimy stools, which are offensive and frequent. There is soreness at the pit of the stomach, tongue red and sore, urine scanty or suppressed. A key note for it is, involuntary stools, with nausea, and pains and tenesmus in the rectum. It follows *aconite* well, and may be given when indicated, in alternation.

Nux vom.—Pain as if bruised in neck of uterus, pain in small of the back, when patient turns in bed. When metritis affects the patient, Dr. R. Hughes says, it is especially indicated.

Hyosciamus.—The fever assumes a typhoid form with furious delirium, patient apathetic, or its opposite very excitable; cannot sleep.

Apis mel., *arnica*, *ipecac*, *pulsatilla* and *stramonium* may all be called for, and the practitioner can select them whenever indicated.

Diet.—In this disease, I prefer milk, beef-broth, clam-juice, Mosquera's beef-cacao, toast, buttermilk, and such other nutritious food and drinks, properly selected, as the patient desires.

The following we have used for several years when nothing else could be borne: Take the whites of two eggs and put them into a bottle with two ounces of lime water. Shake the contents for at least five minutes. Now add half a pint of new milk, and shake well again; finally, a little sugar, sherry wine and nutmeg may be added, to suit the patient's taste. I can speak of this preparation in the highest praise, and often prescribe it in general practice, for a variety of serious ailments.

Carbonic-acid water from a syphon bottle will be found very grateful to the patient, and greatly alleviates thirst and nausea. It may be given at any time, and will not interfere with the remedies prescribed. Frequent draughts of hot water should be given for the nausea; they will be found to give material relief.

Alcoholic Stimulants.—In malignant forms of puerperal fever, I would especially recommend alcoholic stimulants to be given freely. I have used stimulants for the last ten years, and take occasion to state that clinical experience has confirmed me in their utility and safety. If the stomach bears the stimulant badly, administer it hypodermically, or with milk by enema. In the worst forms of puerperal septicæmia, as likewise in malignant scarlet fever with a temperature of 105° F., pulse of 120, or more, give whisky every hour or two, to keep up the strength and to assist nature in eliminating the poison. It has been proved by physiologists that alcohol under certain conditions possesses an antipyretic action. It cannot be relied upon to abate ordinary febrile excitement, but we have much clinical experience to prove that it moderates *septic fever*. We know that alcohol lessens the oxidizing tendencies of the red corpuscles of the blood, diminishes the sensibility of the brain and nervous system, and renders the poison of septicæmia and scarlet fever less intense and energetic, so that it cannot act so deleteriously as it does when no alcohol is administered.

The celebrated German physiologist, Moleschott, says in his quaint language: "Alcohol is the savings bank of the tissues." I know from experience that alcohol acts favorably against the inroads of necrotic processes, such as we are liable to have in septicæmia, scarlatina and diphtheria. The administration of alcohol in puerperal sepsis seems to have been first employed by Professor Breisky, of Vienna, and later was taken up by Runge, and recently by Dr. Martin, of Berlin, who especially recommends it. Martin advises alcohol to be given in the form of cognac, rum, Burgundy or Bordeaux wine, and champagne. He insists upon the most concentrated food. He says it frequently requires energetic persuasion on the part of the physician and attendants to induce patients to take spirituous drinks, which often have to be changed.

When diarrhœa occurs, alcoholic stimulants must be given with a little caution, and changed frequently. The effect of alcohol consists in strengthening the heart's action, and in the increase of the resisting power of the individual against the ravaging action of the infection.

Where we have peritonitis in puerperal disease, with great agony, I am certain of having saved lives and brought relief by an occasional hypodermic injection of morphine.

In some cases the pains are so intense that humanity dictates we should give temporary relief by a hypodermic. In my experience I have never seen anything but good results from its judicious use. We must bear in mind that we have a fearful disease to combat, and that it is our duty to do everything to alleviate as well as to cure our patient. Hot water applications give great relief. The condition of the bladder should be carefully watched, and the urine drawn off whenever it cannot be passed naturally. I have seen in practice, more than once, the case of a distended bladder mistaken for a metritis. The proper diagnosis of the case saved the life of the patient. In one case nearly two quarts of urine were evacuated by the use of the catheter, followed by immediate relief and rapid convalescence.

In consultations, especially with midwives, and young physicians, I have occasionally found the bladder of a puerperal woman entirely neglected, and as soon as the urine was drawn the patient at once improved.

Use of the Curette.—In some cases of puerperal diseases attended by fever, where there is a bad smelling discharge from the uterus, with all the symptoms of a metritis or metroperi-

tonitis and impending septicæmia, we may find that portions of the placenta have been retained. In such cases *curettement* is necessary. Introduce the blunt curette, having previously covered it with iodoform, and carefully remove any remains of the placenta that may have been retained. Sometimes (perhaps in the majority of cases) it may be necessary to use the sharp curette, if there are pieces of the placenta situated high up which cannot be detached with the blunt curette.

After the curette, use an intra-uterine injection of hot water and thymol, 1 to 1,000, or creolin, one per cent., or any other antiseptic such as we have mentioned, except sublimate, which, in this special case, we use only in a solution of 1-10,000. After this, the vagina should be lightly packed with iodoform gauze, that may be repeated for a day or two, or longer, which will keep up a safe drainage. The iodoform gauze should be continued until the offensive odor has quite disappeared.

Refrigeration.—This may be effected handily by applying cold water compresses over the abdomen, or what is still more practical for reducing the temperature, we may use the cold-coil, known as Leiter's Vienna coil. This may be filled with iced water, and applied over the abdomen.

Refrigeration is to be used especially in cases of very persistent fever that seems to have baffled all other remedies.

CONCLUSIONS.—1. Puerperal fever, or toxæmic puerperal disease, is peculiar to the lying-in woman, and therefore appropriately named.

2. The *essential* causes of the disease may be unknown to us; but we know that there must be some abnormal conditions of the blood, together with epidemic influences, namely, external infection, psychic conditions, emotions and shock. Traumatic injuries coming from lingering and instrumental labors may singly or conjointly favor the development of the disease.

3. Puerperal fever may be so severe as to exhaust the patient rapidly and terminate with death within two to four days, and fatal cases may happen in obstetrical practice called "sudden death," where it is impossible to discover the exact cause of the infection or its location.

4. Local inflammations may affect women in confinement, without puerperal fever.

5. We agree with the late Professor Fordyce Barker, that septicæmia may be developed in puerperal women either from *autogenetic* or *heterogenetic* infection, without puerperal fever;

but such an infection is usually a complication of puerperal fever.

6. If it be true that puerperal fever is an essential disease, then we shall have to concede that a specific zymotic and contagious disease may, under certain circumstances, follow parturition. (It should, therefore, be the duty of every obstetricist to give the patient he is engaged to attend, careful advice to observe the rules of hygiene, to avoid contagion, and to take a well selected and nutritious regimen, so that her constitution may be prepared and fortified to undergo the trials she will be subjected to during the puerperium.)

7. The opinion current among some of the profession, that puerperal fever occurs only after severe labors, is not true. In some cases it sets in insidiously, after a normal and easy labor, and this apparently proves that women in confinement are peculiarly sensitive to certain unknown noxious influences that may favor the development of an essential fever, zymotic in character.

In as brief a manner and as clearly as possible I have endeavored to give the facts of the subject matter of child-bed fever.

I trust, that it may prove as interesting to the profession as it has been to me

I have my own practice and experience for many years to guide me, and have studied with some care the best authorities on the subject. Ever glad to learn whatever has been proved by others, I claim to be only a student still. Few things are more wonderful than the great advances being made in the art and science of medicine.

APPENDIX.

ANTISEPTIC MIDWIFERY.

By L. L. Danforth, M.D.

Antiseptic midwifery, as this subject is understood at the present time, presents in the development of its history most remarkable phases.

Its origin dates from the efforts of Semmelweiss in 1847* to reduce the fearful mortality which everywhere attended the lying-in of women, especially in the large Maternities of the world.

From this beginning the doctrine has extended and has wrought such remarkable results that its discovery and promulgation may justly be ranked in beneficence to mankind next to Jenner's discovery of innoculation for the prevention of small-pox.

In order to understand the full import of this assertion, we must review the history of midwifery with respect to the mortality from the so-called puerperal fever, for it is in its relation to the prevention of this dread disease that antisepsis has acquired its highest usefulness.

Beginning at so remote a period as 1664 in the Hotel Dieu in Paris—the most ancient epidemic of which we have any history—down to the last decade, the mortality among lying-in women was simply appalling. In the Maternity Hospital of Paris the mortality in 1866 was 11.6 per cent., and in 1864 20.3 per cent., and for ten years from 1860 to 1870, it averaged 9.6 per cent.†

* From Paul Bar's "Antiseptic Methods in Obstetrics," (Paris, 1883) we learn that Harvey practiced intra-uterine injections in cases of retained placenta. Recolin (1757) proposed intra-uterine injections of warm water. Levret (1786) wrote: "If there be any putrefaction I obtain its discharge and that of the foreign substance (placental fragments) by means of aqueous injections made into the cavity of the womb; and I find it very useful." But these writers did not possess correct information as to the nature of puerperal infection, and they had no conception of the true antiseptic method. Dr. Oliver Wendell Holmes, in a paper entitled "Puerperal Fever as a Private Pestilence," published in 1843, called the attention of American physicians to the contagiousness of child-bed fever, and laid down rules for the guidance of the practitioner which if followed would tend to the limitation of this disease. If Dr. Holmes had never done anything but this to merit the gratitude of his countrymen, his efforts in this direction should be made an everlasting monument to his memory. He says: "1. A physician holding himself in readiness to attend cases of midwifery should never take any active part in the post-mortem examination of cases of puerperal fever.

"2. If a physician is present at such autopsies, he should use thorough ablution, change every article of dress, and allow twenty-four hours or more to elapse before attending any case of midwifery. It may be well to extend the same caution to simple cases of peritonitis.

"3. Similar precautions should be taken after the autopsy or surgical cases of erysipelas, if the physician is obliged to unite such offices with his obstetrical duties, which is in the highest degree inexpedient."

† Bar. Paris, 1883.

In the Prague Maternity the mortality in 1865, was 9.28 per cent.; in 1869, 11.62 per cent.

It was such statistics as these which led Fritsch to exclaim: "To be laid on the bed of confinement was equal to being delivered to the hangman."*

During the six years prior to the advent of Semmelweiss in the Vienna Obstetrical Clinic the mortality was 9.92 per cent. As a result of the improved methods under this obstetrician the mortality dropped to 1.27 per cent.

Semmelweiss was led to the adoption of the measures which wrought this remarkable change by observing that the mortality occurred in the wards reserved for physicians only, while in those attended solely by midwives the mortality was comparatively small. He furthermore noticed that the fatal cases occurred in healthy primiparæ with a protracted first stage; many of their children also dying, and showing the same post-mortem changes that were found in the mothers. Women who were confined on their way to the hospital and afterwards detained there, as well as the cases of premature labor, in which there were few or no examinations made, were rarely sick. The increased mortality in the wards attended by physicians he attributed to the fact, that the medical students who were engaged in dissections and the post-mortem examinations visited these wards, examined the patients, and thus conveyed the poison from which the disease developed. The ordinary cleansing with soap and water was not enough to take away all contamination, as the odor clinging persistently to the fingers showed. He ordered at once that a remedy be used to destroy these putrid matters, that the hands be washed with chlorine water, or with chloride of lime! The result was the diminution of the mortality from nearly 10 per cent. to a trifle over 1 per cent.!

Basing his conclusions upon the remarkable results obtained by the adoption of the new method, Semmelweiss advanced the doctrine that puerperal fever was due to the introduction of poison from an external source, mainly from the absorption of putrid animal substances: he believed also that it might arise in rare instances from poison engendered within the body of the woman herself, by the spontaneous decomposition of lochia, retained fragments of decidua, of blood coagula, of necrosed tissue, or in consequence of severe instrumental labors. In other words, that this so-called puerperal fever was no new specific disease, but a variety of pyæmia. This was in opposition to the generally accepted belief that puerperal fever was an essential fever, as much so as typhoid fever, or typhus fever, and peculiar to child-bed.

It would be supposed that a method which had accomplished so much in the diminution of mortality among lying-in women would be hailed by all as the greatest boon that could be conferred upon afflicted humanity. Like other discoveries of importance to mankind, particularly in the sphere of medicine, opposition at once met the promulgation of the new doctrine.

Some there were like Rokitansky, Skoda, Hebra, and Simpson,† in Edin-

* Grundzüge der Pathologie und Therapie des Wochenbetts, 1884.

† Simpson said they had long known in England what they stated as new in Vienna. The assertion was probably based on Denman's statement that puerperal fever could be

burgh, who upheld it. But Scanzoni, Kiwisch, and Seyffert in Germany were opposed to it, and talked violently against it. The Paris Academy of Medicine decided unfavorably upon it, and even in Germany there was more scepticism than belief. Virchow as late as 1864 before the Berlin Obstetrical Society declared himself positively against Semmelweiss' theory of infection from outside, as regarding the epidemic propagation of puerperal fever. "Just as well," he says, "as an anthrax may originate spontaneously in an animal, may puerperal fever do the same in the deep cellular tissue of the female pelvis."

The late Dr. Fordyce Barker in his classical work upon the Puerperal Diseases (1874), and in his later writings and utterances, was the most active opponent in this country of the now accepted doctrine concerning the origin and prophylaxis of puerperal fever.

The researches of modern scientific investigators, as carried on by Pasteur, Koch, Doléris, and others, have borne out the earlier theories of Semmelweiss. As a result of these researches scientists are now able to formulate certain principles relating to septic and purulent infection, which we may accept as established facts.

1st. The so-called puerperal fever, or according to the new nomenclature, puerperal septicæmia, is a disease characterized by the invariable presence in the organism infected of minute bodies generally termed bacteria. The common germs of suppurative wounds are the *staphylococcus pyogenes aureus*, the *staphylococcus pyogenes albus*, and the *streptococcus pyogenes. These germs invariably come from without, and are never developed* DE NOVO *in the body of the affected woman.*

2nd. While the entrance and development of micro-organisms within the body is usually the cause of the symptoms observed, these bodies are not absolutely essential to the production of the morbid processes.

The products of bacterial activity, the ptomaïnes or the leucomaïnes (the result of putrefactive changes in animal tissues closely simulating vegetable alkaloids) are equally deleterious to the health of the organism. These poisons may produce the changes to be observed, although these products do not and cannot occur without the previous growth of the organisms which give rise to them.

The symptoms may therefore be due to a double cause; the growth of the bacteria, and the overwhelming of the system by their numbers, or the toxic effect of the alkaloids produced in the course of their growth; and these two influences may act independently or together.

As a result of the improved methods of treatment based upon the recognition of the truth of these propositions, the vital statistics in the Mater-

carried from one patient to another by doctors and mid-wives, and that the poison was the same as that producing the acute exanthemata, though he believed also that there were other etiological factors capable of producing it. Certain it is that in England, long before the doctrine was received elswhere, most physicians believed in the contagiousness of puerperal fever. It was the custom long ago to isolate the sick, and the attendance at private houses was so well organized that is was exceptional for a puerperal patient to be conveyed to the Maternity for treatment. In the Dublin Maternity from 1850 to 1854, the mortality ranged from 0.56 to 0.89 per cent. But no one suspected the full import of Denman's suggestion. Simpson in 1850 published a paper "On the Analogy Between Puerperal and Surgical Fever," in which he admitted the indentity of puerperal and surgical fever. This article is well worthy of perusal at the present time, and accords in many respects with the modern doctrine concerning the origin of puerperal fever.

nities of the world have been entirely revolutionized. In private practice the results have not been so striking because physicians have not universally adopted the teachings of modern science as they should have done. Improvement in this respect is however going on, and we may expect to see septicæmia practically stricken from the list of puerperal diseases, as soon as physicians will take the necessary precautions to exclude disease-producing germs from the bodies of their puerperal patients. No greater proof of this assertion is needed than to refer to the statistics of some of the leading Maternities in this country and in Europe.

In the Tarnier pavilion connected with the Paris Maternity every woman who comes to be confined occupies a room completely isolated during the whole period of her lying-in until she is entirely recovered. Here the antiseptic method was rigidly enforced from 1876, with six deaths from 1876–79 (inclusive). From 1880–83 there were no deaths and only eight cases which could be called septic in character. According to Galabin* of London the rate of mortality in English Maternities since the use of antiseptics is two to one thousand instead of the former rate of ten to one thousand (total mortality); deaths from septicæmia or pelvic inflammation 1.5 to 1000. The number of cases in which slight elevations of temperature occur after delivery has fallen off one-half.

Slawjanski,† of St. Petersburg, reports the morbidity and mortality in fifty-two institutions in Russia, representing 21,280 labors. Repeated elevations of temperature were observed in 6.9 per cent., and the mortality from puerperal diseases was only 0.28 per cent.

To Dr. Henry J. Garrigues of New York City is due a large share of the credit for the advance which has been made in this country in the management of lying-in hospitals, and also in private practice, with reference to the adoption of antiseptic measures. His monograph on "Antiseptic Midwifery"‡ should be read and pondered by every practical obstetrician. As an example of the results accomplished by Dr. Garrigues, the mortality in the Maternity Hospital Blackwell's Island New York City affords a most striking illustration. From October 1, 1882, to October 1, 1883, under the old régime, 447 patients were confined, with a total mortality of 6.71 per cent., while for the nine years from 1875 to 1883 (inclusive) the total mortality was 4.17 per cent.

Under Dr. Garrigues from 1884 to 1888 (inclusive) there were 2,271 deliveries, with a total mortality of twenty-four (1.06 per cent.); only six of this number, or 0.27 being due to sepsis. In the years 1885 and 1888 there were no deaths from sepsis.

The change in morbidity is no less remarkable than the reduction in mortality. Very few of the puerperæ were sick under the improved régime, and those who were ill only slightly so.

In the Boston Lying-in Hospital the change has been no less remarkable. The mortality from sepsis from January 1, 1882, to December 31, 1882, 288 patients, was 5.55 per cent.

Dr. Wm. L. Richardson reduced the mortality in this Institution during the period from January 1, 1886, to December 31, 1886, 373 confinements, .0 per cent.

* Transactions Tenth International Congress (Berlin, 1891).
† *Ibid* (Berlin, 1891).
‡ Published by Geo. S. Davis, Detroit, Mich., 1886.

In the Sloane Maternity,* in New York City, the mortality from septicæmia was one case in one thousand successive confinements, and this patient was admitted in the second stage of labor, in a most filthy condition, having been examined at her home, and from her symptoms and temperature was believed to be in a septic condition when she entered the hospital.

Such statistics as have been quoted must have a powerful influence in impressing upon the minds of practical obstetricians the necessity for the utmost care in the management of their puerperal cases. It should be the duty of every one thus engaged to make himself familiar with the sources, nature and prevention of septic infection.

Treatises on bacteriology† afford much information relative to this subject, which is interesting and of an exceedingly practical nature.

It is only by an appreciation of the relation to practical midwifery of these comparatively recent additions to human knowledge that any genuine advance can be made in the diminution and final elimination of septic processes from the lying-in chamber.

The prevention of puerperal infection by strict adherence to methods of treatment which have for their object the exclusion of disease germs, is a matter of supreme importance, and the principles of this method should be followed with religious conscientiousness.

We know now that the entrance of the micro-organisms into the system invariably occurs through the genital tract, the germs being conveyed thence by means of the hands or clothing of the physician or nurse, the instruments employed, or through the medium of the air of the lying-in chamber, at a time when the vagina and uterus are in a state of greatest receptivity.

As a natural corollary of this fact the prevention of infection can only be accomplished by the adoption of the most thorough cleanliness in every detail of the lying-in chamber.

As prevention is better than cure, so *asepsis*, viz.: the exclusion of micro-organisms from wounds and their discharges, is superior to *antisepsis*, which is the destruction of disease germs after they have gained an entrance into the body, by the use of antiseptic agents.

Thorough cleanliness, and the destruction of disease germs before these organisms have had time to penetrate the deeper tissues of the body should be the chief aim of all engaged in obstetrical practice.

In Germany the subject of antiseptic midwifery is made a matter of State regulation, especially in the practice of midwives, and similar laws should be enacted in this country. It should be the duty of municipal authorities and also of the individual physician to enlighten the laity, especially the poor in large cities, who live in crowded tenement houses, on the necessity for greater cleanliness than is ordinarily observed, in all that pertains to the lying-in chamber. Even though the apartment be small, poorly ventilated, and the preparations of the simplest character, a very small expenditure of money will provide such articles as are neces-

* Report on the first series of one thousand successive confinements, from January 1, 1888, to October 1, 1890, by Jas. W. McLane, M. D. *American Journal of Obstetrics, April, 1891.*

† "The Etiology of Puerperal Fever," by Harold C. Ernst, M. D. *American System of Obstetrics*, Vol. II, p. 401.

sary to enable the physician to carry out the details of the antiseptic treatment in a very satisfactory manner. A few words from the medical attendant as to the benefits to be derived from these simple precautions, will in most instances enlist the coöperation of the patient and her friends, and such articles as are needed will be cheerfully procured. The effect of these precautions will unquestionably be a marked diminution in both morbidity and mortality among puerperal women.

The physician himself should always remember that puerperal septicæmia is a preventable disorder, and that its occurrence betokens some neglect in attention to those details of personal or general hygiene whereby the genital tract becomes infected.

Self-infection (auto-genetic) is impossible in the light of our present knowledge of bacteriology. We cannot admit that the patient can produce any poison herself. The wounds in the genital tract, a retained blood-clot, a piece of placenta, or a shred of membrane in her uterus, afford a most favorable soil for the development of the microbes, but these must come from the outside (hetero-genetic infection).

It is possible that germs may have found lodgment in the genital tract of the woman before labor came on, and in this sense we may admit auto-infection. But so long as the mucous membrane of the genital tract remained intact, no harm could be done, for the germs formed no part of the organism of the patient; they were foreign bodies, ready to do their work when access to the deeper tissues was afforded them. The noxious germs may emanate from a variety of sources, and in proportion as these sources are numerous so should be the thoroughness of the measures to prevent their entrance to the genital tract of the patient.

Inasmuch as it is probable that the germs may gain admission through the air, as well as through the medium of the hands and instruments of the physician and nurse, a lying-in chamber should be selected in which the atmosphere cannot be contaminated by proximity to a sewer, a privy, or any decomposing animal or vegetable substance.

If the lying-in chamber adjoins a bath-room or water-closet the door between the apartments should be kept closed as much of the time as possible, and Platt's Chlorides used to flush the waste-pipes from all basins and bath-tub.

The room, so far as practicable, should be divested of all superfluous furniture, and made as light and airy as possible.

Every examination of the woman, whether in the last days of gestation, or during labor, should be preceded by a thorough ablution of the hands and arms to the elbows with soap and water, thoroughly scrubbing the skin, and particularly the finger-nails with a nail-brush. Dirt under the nails should be removed with a nail-cleaner, before the scrubbing with the brush and not after. To be prepared for this preliminary cleansing, the accoucheur should carry in his obstetric bag the articles requisite to accomplish this work, viz.:—a nail-brush, a nail-cleaner, bi-chloride of mercury tablets (Wyeth's), and, on account of its superior cleansing qualities, an ounce jar of *Sapo Viridis** (the green soap of the German Pharmacopœia), which any pharmacist can supply.

* The soft potassa soap made in this country, though perhaps not possessing the same germicide power as the German, is much superior to the hard soda soap in common use.

The latter is to be used instead of the ordinary soap commonly used in the household. The use of the green soap is especially valuable in cleansing the hand and removing germs situated in the deeper layers of the skin, in case one has been dressing a wound or attending a case which could by any chance give rise to infection.

After washing the hands and arms in the manner described, they should be soaked for three minutes in a solution of bi-chloride of mercury (1–1000), in which the scrubbing may be repeated.

If the accoucheur has been in attendance upon a case of any of the zymotic diseases, or a case of puerperal septicæmia, or upon a surgical case of a septic nature, or upon any other disease liable to infect the patient, he should before going to the lying-in room take a full bath containing one or two drachms of the bi-chloride of mercury, being particular to wash the hair and beard while in the bath. His clothing should be changed throughout. Before examining the patient the preliminary cleansing of the hands and arms should be carried out with extraordinary thoroughness. Unless the accoucheur who has been exposed to contagion can spend the time to perform these necessary ablutions, and change his clothing, it is his duty to decline to attend the case.*

* Recent researches by Howard A. Kelly, M. D. (Johns Hopkins University), on "Hand Disinfection" (Am. Jour. of Obstetrics, Vol. XXIV, Dec., 1891) are of great interest in this connection.

Dr. Kelly's conclusions on this subject are as follows:

I. "Staphylococci (mostly albus) were present on the hands of all persons examined." *Sixty-five experiments* were made with doctors who scrubbed their hands *ad libitum* (ten to twenty minutes) with strong brown soap and hot water frequently changed. Eleven of these were outside the gynecological staff. In every instance of the eleven, myriads of coccal colonies developed. In the remaining *fifty-four* cultures, taken from Dr. Kelly's gynecological assistants and himself, all but nine yielded numerous colonies. These nine are to be explained by the inhibiting power of bi-chloride of mercury used the day previous. From these experiments Dr. Kelly concludes:

II. "It is impossible to get rid of these staphylococci by scrubbing the hands and nails from ten to twenty-five minutes with a sterilized brush, soap, and water, temperature 40° C. (104° F.)"

III. "*Bi-chloride of mercury solutions as strong as 1-500 are not germicidal* after the immersion of the hands for from two to five minutes. The mercuric salt acts either by mechanically coating or chemically combining with some portion of the coccus, thus *only inhibiting further growth* until the salt is precipitated or removed." This inhibiting action may persist at least twenty-four hours after the last use of the drug. During this period attempts to develop coccal colonies by precipitation with a sterile ammonium hydrosulphuret solution were futile; after that period colonies were found.

IV. "*Solutions of potassium permanganate and oxalic acid are the best germicides.* Experiments have demonstrated that the permanganate of potash, applied to the hands in saturated solution, and then decolorized by a saturated solution of oxalic acid, is the most efficient germicide in our possession."

Dr. Kelly's method is as follows:

1. "Scrubbing the hands, with especial attention to the nails—not more than one millimetre in length—for ten minutes, in water frequently changed, at about 40° C. (104° F.).

2. Immersion of the hands in a solution of permanganate of potash, made by adding an excess of the salt to boiling distilled water, until every part of the hands and lower forearms is stained a deep mahogany red or almost black color. They are then transferred at once to a saturated solution of oxalic acid until completely decolorized and of a healthy pink color. This decolorization is accompanied by a sense of warmth, due to chemical reaction, and a sharp stinging wherever there is any abrasion of the epidermis.

3. Washing off the oxalic acid in warm sterilized water.

"By this simple process the hands are rendered more sterile than by any other known means."

These same precautions in every detail should be enjoined upon the nurse.

Instruments should be carefully scrubbed with soap and water before use, and then immersed in a carbolic or creolin solution of 2 per cent. strength. When a woman is taken in labor the nurse should be directed to bathe the abdomen, thighs, buttocks and especially the labia and the sulci near the genitals with a bi-chloride solution (1-2000).

ANTISEPTIC PRECAUTIONS DURING LABOR.

In private practice it is advisable to give a creolin* douche (1½ per cent. strength), or a corrosive sublimate douche (1-2000), at the beginning of labor.

Examinations should not be made oftener than is absolutely essential to note the progress of the case. During labor a bowl of the bi-chloride solution (1-1000) should be kept at the bedside where the physician can easily reach it, and the patient should not be touched until the hand has been immersed in this fluid for a minute or more. After an examination the hands should be thoroughly scrubbed as in the beginning. The ordinary lubricants, such a vaseline, oil, lard, etc., are unnecessary and dangerous. The practice of anointing the imperfectly cleaned finger with vaseline, which has already been used for all sorts of purposes in the household, is exceedingly reprehensible. In fact, a lubricant for ordinary examinations is unnecessary. The fluid that adheres to the finger when we dip the hand into the solution of bi-chloride or creolin, the last moment before entering the vagina, is all that is necessary. The same applies to the forceps and other instruments after rinsing in the creolin solution.

As a lubricant for the hand and arm in case it is necessary to enter the vagina or uterus, employ a glycerole of carbolic acid 3 per cent. strength. Garrigues recommends *mollin* (5 per cent. carbolic), which looks much like lard, softens readily on the skin, makes the latter very slippery, and washes off easily.

In protracted cases the vaginal douche should be repeated every three hours. In ordinary cases vaginal douches are unnecessary. After delivery the patient is washed scrupulously clean with the antiseptic solution, a hot vaginal douche (bi-chloride 1–4000) is given, all soiled clothing removed, and the bed arranged with everything clean throughout.

Intra-uterine injections (hot creolin or carbolic solution, 2 per cent.) are advised in every case in which it has been necessary to introduce the finger, the hand, or instruments into the interior of the womb. For this purpose the physician should possess and always carry in his obstetric bag with the other articles previously named, a long glass tube (Chamberlain's tube) curved like a male catheter, with openings at the sides and end; this should be attached to the tube of a fountain syringe. This tube should be passed to the fundus and the direction and distance should be determined by the external hand on the fundus. It is of course under-

*Creolin (a coal tar derivative) gives results fully as satisfactory in ordinary cases as those of corrosive sublimate, and is a better deodorizing agent than carbolic acid or the sublimate; it is also safe for intra-uterine irrigation, and possesses an oily consistency which renders it especially good for hands, arms, and instruments. Creolin may be employed in the strength of 2 per cent. (about two drams to the pint), and it makes a better solution if mixed with cold water first, and afterwards placed in the hot water.

stood that preventive antiseptic treatment, apart from gynecological considerations, demands an immediate repair of all save the slightest lacerations of the genital tract. After these details have all been fulfilled, the final douche given, and the external parts made as clean as possible, the *occlusion dressing*, in place of the ordinary napkin, is now applied to the vulva.

The occlusion dressing as described by Garrigues* is made as follows: "The vulva is covered with a pad of absorbent cotton wrung out in the solution (bi-chloride 1–2000). Outside that comes a piece of oiled silk, or preferably thick gutta-percha† tissue dipped in the solution. The cotton pad should reach from one genito-femoral furrow to the other, and cover the symphysis in front and the anus behind. The water-proof tissue must go one finger-breadth beyond the pad in all directions, and is folded forward against the inside of the thighs. To keep this antiseptic part of the dressing in place, use a dry pad of absorbent cotton and a rectangular piece of canton flannel, or a square piece of unbleached muslin, half a yard in both directions and folded diagonally like a cravat. The ends are likewise folded in, so as to obtain a rectangular bandage five inches wide and about fourteen inches long, which is pinned with four pins in front and two behind to the binder, so as to fit the parts tightly. This dressing is removed in the morning, the afternoon, and the evening. The patient passes her urine spontaneously, or if she is unable to do it herself, it is drawn with the catheter. A stream of lukewarm solution is directed by means of a fountain syringe over the outside of the genitals and the adjacent parts, and a fresh dressing is applied."

If cheapness is desired, ordinary cotton batting can be used instead of the absorbent cotton, but it does not absorb the discharges so readily, and is more bulky than the absorbent cotton.

Antiseptic douches after labor are not necessary if the foregoing preliminaries have been faithfully carried out.

THE ANTISEPTIC TREATMENT OF PUERPERAL INFECTION.

The first symptoms of septic infection as evidenced by chill, fever, pain in the uterus, distention of the abdomen, flushed face, throbbing headache, diminution of the lochia, do not usually occur until the third or fourth day after confinement. The symptoms may come on with less violence and are not therefore so manifestly septic in origin; but whatever the mode of onset, as soon as the diagnosis is established, intra-uterine irrigation should at once be made—not by the nurse—but by the physician himself, with all the care of a surgical procedure.

The long glass tube, or a double current metal catheter, should be passed to the fundus, and a quart of hot water (110°–115° F.) should be allowed to irrigate the cavity. The precaution should be observed to wash out the vagina before the tube is introduced into the womb, and also to elevate the fountain bag no higher above the bed (one foot will answer)

* Antiseptic Midwifery, p. 50.

† The gutta-percha tissue can be purchased in small boxes containing from one to three yards wherever surgical supplies are sold. It is more expensive than oiled silk, but preferable on account of its lightness, though oiled silk answers an excellent purpose as a water-proof dressing.

than will cause the water to flow gently but steadily. The cervix is at this early stage after confinement always so open as to permit the easy outflow of the fluid.

Simple boiled water would no doubt suffice in most cases to accomplish the desired result, which is to flush the uterine cavity of all debris and decomposing material, just as we apply the principle of drainage and irrigation to a septic cavity elsewhere in the body. To make the irrigation more effective, however, it is safer to use an antiseptic. Creolin, 1½ to 2 per cent. strength, or permanganate of potash (2 to 3 per cent.), are preferable to carbolic acid or the bi-chloride of mercury for irrigation of the interior of the womb. To obtain the best result the intra-uterine douche must be used early, since by absorption the deeper tissues and the blood soon become affected, and then local measures are comparatively inefficient. The mercuric salt is employed by many obstetricians in the strength of 1-4000, for intra-uterine irrigation, but its use is attended by some danger, and lives have been lost from poisoning by the remedy in the strength of 1-4000 when injected into the uterus. If the kidneys are affected its use is positively prohibited. After an intra-uterine injection of any kind, the fluid should be squeezed out of the uterus and vagina by uterine pressure, and by turning the patient on her side. The irrigation should be repeated every four to six hours depending on the symptoms. This radical procedure may be considered unnecessary by some, but the good results obtained by it are too obvious to be questioned, or to need any defence. It would seem to be more rational to strike at the origin of the poison at once, than to rest content with vaginal irrigation which can only wash away the drainage, and leaves the source of the infection uncleansed. It is better furthermore to resort to this operation early, before septic infection has taken place to a serious degree, than to delay until the poison has passed beyond the reach of local disinfectants.

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